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November 1983

paper board packaging

Flexo Press Project Report

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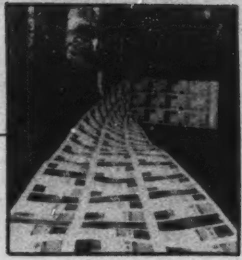
NOVEMBER 1983 VOLUME 68, NO. 11



On the Cover:

This flexo roll sample was pulled from an entire press as the sequence of colors was being individually laid down. This Zerand innovation is described in a feature beginning on page 28. (Photography by Jeff Frey)

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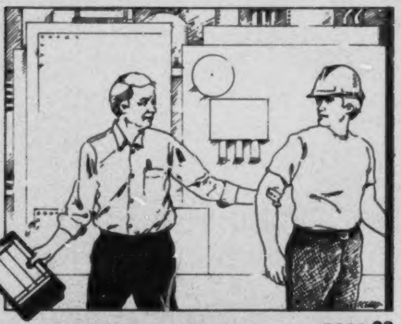

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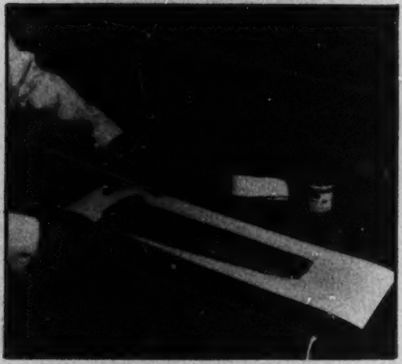

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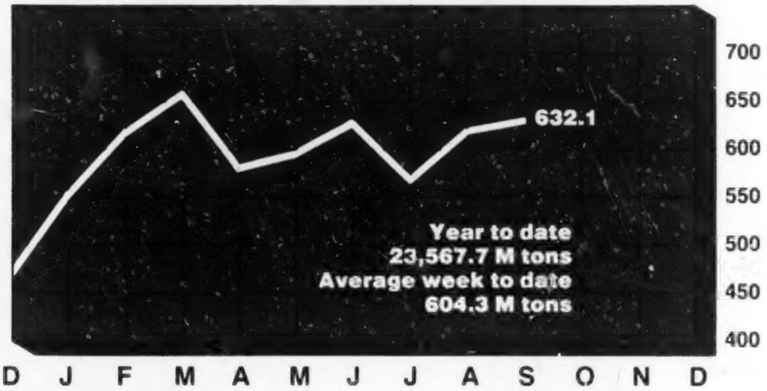
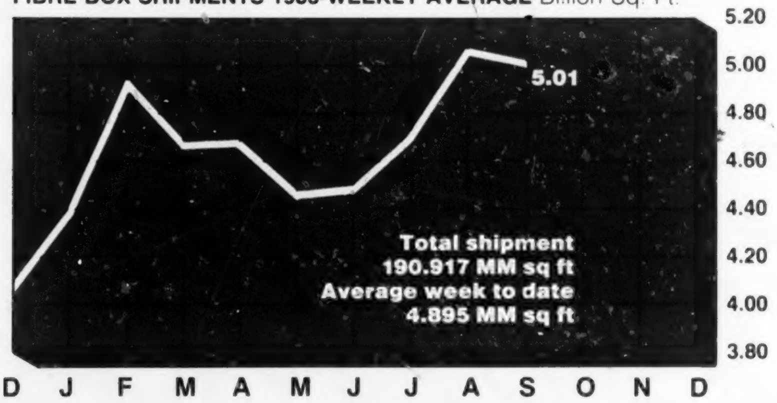


PAPERBOARD MILL OPERATIONS:

The first three quarters of 1983 concluded with average-week board output 7.7% ahead of same-period 1982 tonnage, compared with a 9.2% drop in '82 from '81, a 3.8% rise in '81 from '80, a 1% drop in '80 from '79, and a 3.3% rise in '79 from '78. Thus goes the typical annual seesaw. However, total tonnage at this September-end was, in fact, slightly above that volume in the all-time-high production year of 1979. Further, output during the August/September period was 9.6% up from last year—evidently a strongly founded trend of improvement.

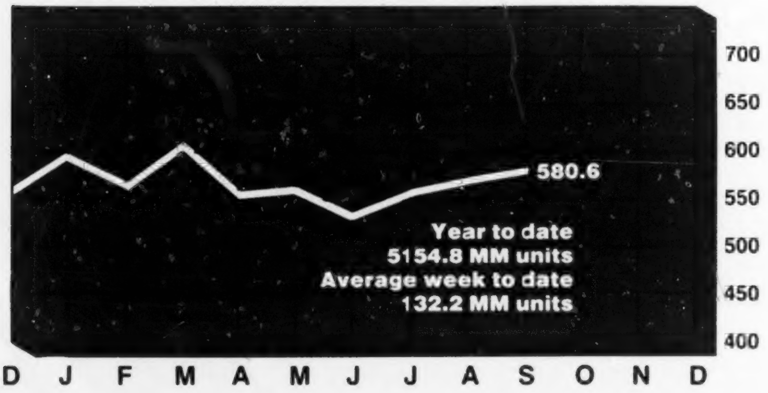
FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



PAPERBOARD-TYPE PRODUCTION:

In September, 2717.6 M total tons of output—up 9.9% from '82—appeared as 2016.9 M of containerboard grades—up 11.3%—and 700.7 M of boxboards—up 6.1%—according to projections from the American Paper Institute's "production by furnish" data. This 2.88-to-1 tonnage ratio compares most unfavorably with the traditional 2-to-1 of more normal economic times, and would seem to substantiate informal reports that improvements are less than robust from boxboard grades, but no longer reported by compilers.

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



RIGID PAPER BOXES:

Three quarters of the way through 1983, major set-up boxmakers report a rise of some 10% in total billings from '82, compared with a decrease of 8% in '82 from '81, a rise of 10% in '81 from '80, of 6% in '80 over '79, and of 8.7% in '79 from '78. The general reduction in money available for non-essentials in recent years is clearly having an effect on the rigid box, normally associated with much "luxury" packaging. The toehold of geography continues also, with high-unemployment areas affected more strongly than others.

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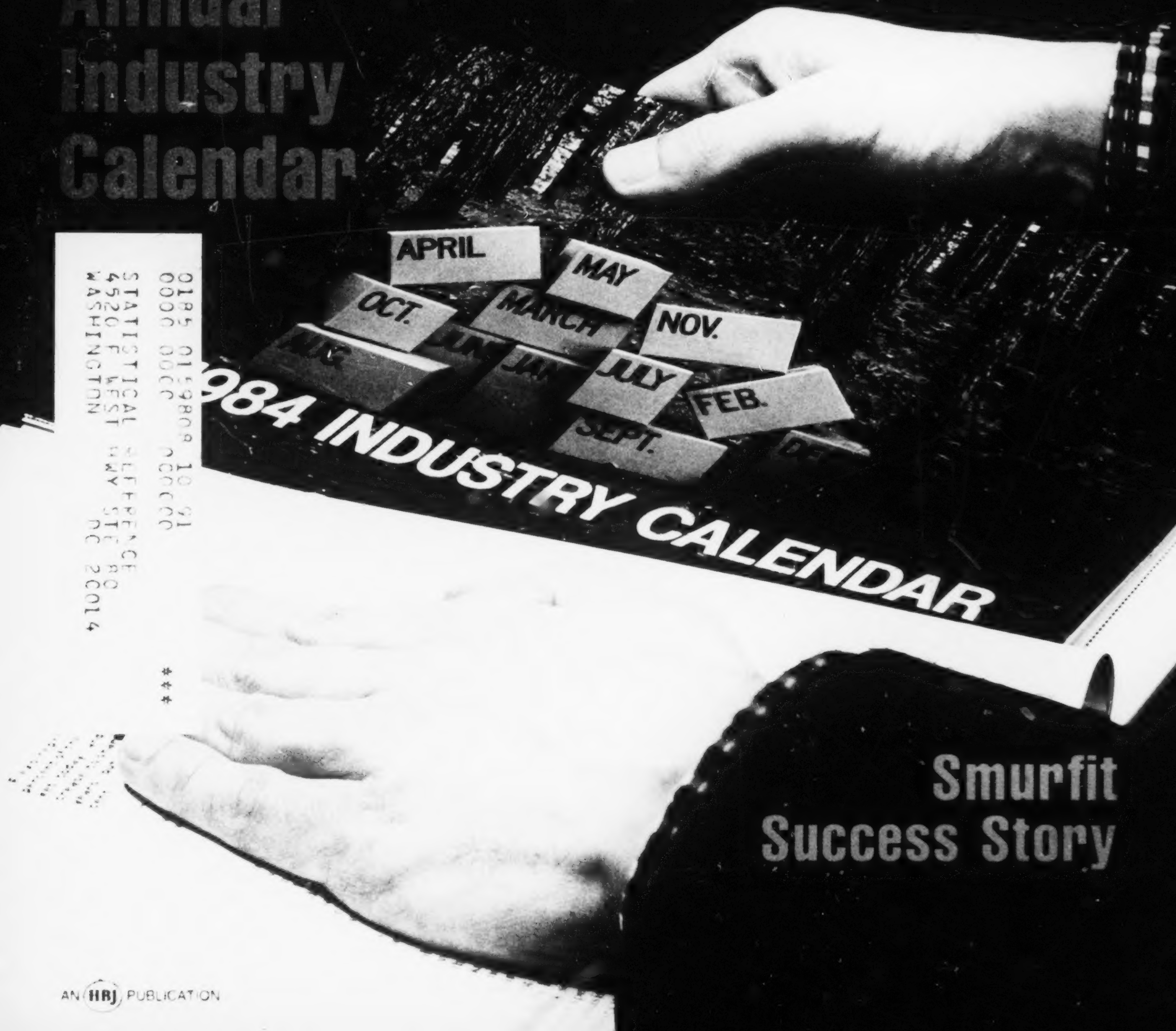
December 1983

paper board packaging

Annual Industry Calendar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Smurfit Success Story

AN HBJ PUBLICATION

paper
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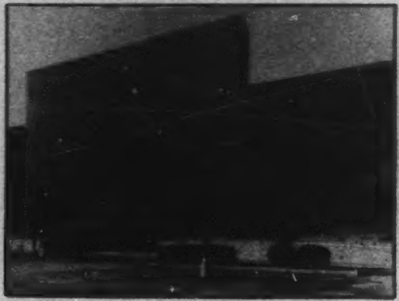
packaging

DECEMBER 1983 VOLUME 68, NO. 12

On the Cover:

Inside this issue you'll find *Paperboard Packaging*'s annual industry calendar. It will provide you with all the dates and locations of next year's major meetings, conferences, seminars and conventions.

FEATURES



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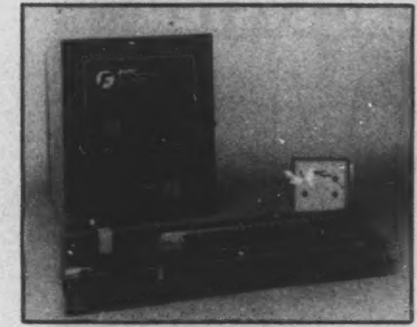
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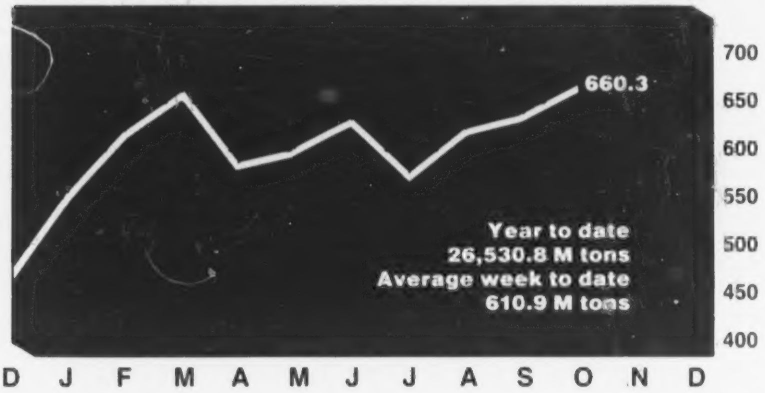
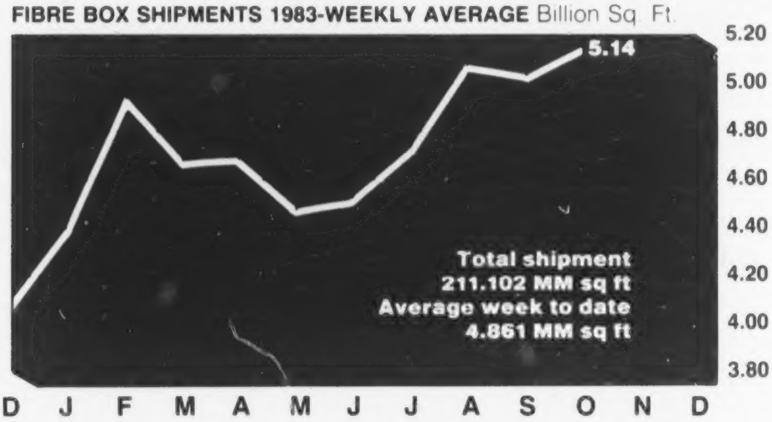


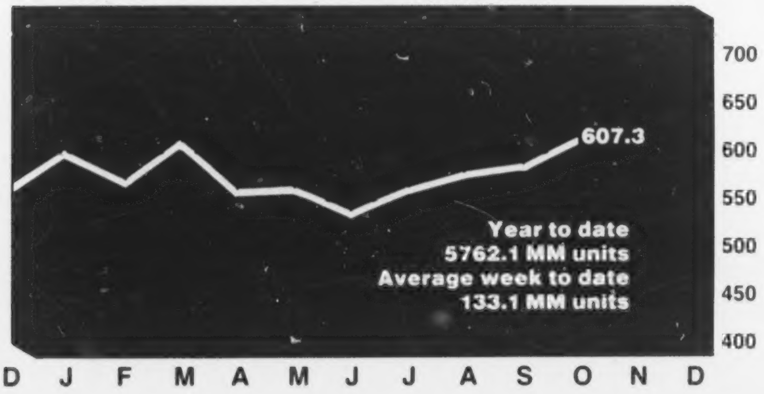
PAPERBOARD MILL OPERATIONS: The first 10 months of 1983 ended with total average-week board volume 8.7% up from last year, which had been down 9% from '81, which was up 3.4% from '80, which was down 1.2% from 1979. This year's October-end volume was less than 1% below the 1981 all-time high for that point. However, the recent recession began in fourth-quarter '81. Thus, the 1979 final tonnage remains a record, though '83 volume is now running well ahead of '79, and a new record may be set. The improvement, as noted below, is in both containerboards and boxboards.

FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



PAPERBOARD-TYPE PRODUCTION: In October, 2924.0 M tons of board output (15.7% up from '82) comprised 2169.1 M of containerboards (17.1% up) and 754.9 M of boxboards (11.9% up), as projected from the American Paper Institute's "production by furnish" data. This relative rise in boxboard volume follows a rather long stagnation in which the containerboards reached a distorted tonnage ratio above 3-to-1. October provided this year's best average-week boxboard production, possibly reflecting a level of box demand that presages a good Holiday retail climate.

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



RIGID PAPER BOXES: Set-up billings are running some 9% ahead of 1982, which had been 7% down from '81, which was 10% up from '80. This continues to reflect the general business upturn. However, the record also continues to display the industry's most remarkable geographical variations. Business for the year ranges, month-to-month, from double-digit improvements in some regions to similar declines in others. Some portion of the billings advance may be due to higher unit prices, similar to those of folding cartons, which go up about 10-12% per year.

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1984 Buying Forecast

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JANUARY 1984 VOLUME 69, NO. 1

On the Cover:

Our cover story is the yearly Buying Forecast (starts on page 24). It appears the year ahead will be lucrative, though the crystal ball goes murky beyond 1984. (Cover design by Mary Hessing. Photography by Steve Senenfelder.)

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This company consists of "plants within a plant," guaranteeing it a long future in the Chicago area.

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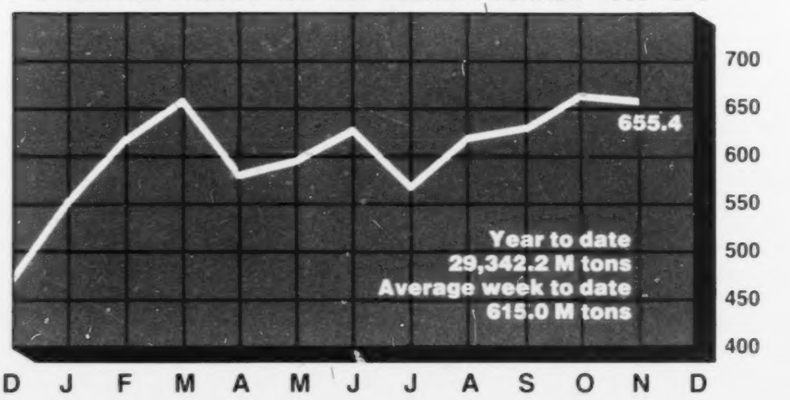
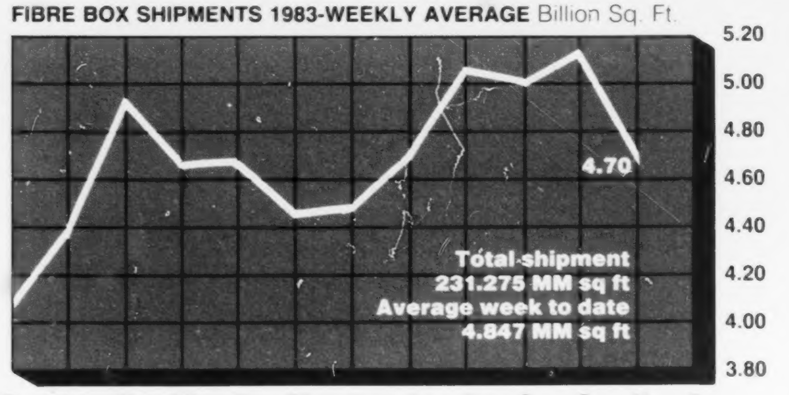


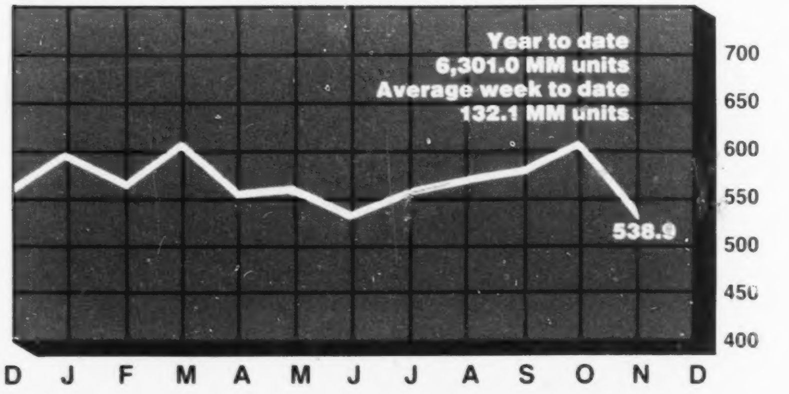
PAPERBOARD MILL OPERATIONS: With a single month of 1983 remaining, total average-week paperboard output was 8.9% above '82, compared with a drop last year of 7.9% from '81, a rise of 3% in '81 from '80, and a drop of 1.9% in '80 from '79. Average-week tonnage at November-end had not yet regained the level of 1981. The '83 record includes an advance of 9.6% from '82 for containerboards and 7.8% for boxboard grades. The former materials were enjoying a record-breaking surge in recent-months' container shipments, and even boxboards responded with atypical vigor to improving national business.

FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



PAPERBOARD-TYPE PRODUCTION: In November, 2099.4 M tons of containerboards (up 13.1% from '81) and 709.3 M of boxboards (up 5.7%) combines for an 11.1% overall increase to 2808.7 M short tons, as projected from the American Paper Institute's "production by furnish" data. One effect of this late-year expansion is that the containerboard/boxboard output ratio moves closer to 3-to-1 from the long-traditional 2-to-1, despite the strong surge in boxboard tonnage. The latter, however, is likely to be simple recovery from a recessive year, since competition from alternate packagings is not receding.

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



RIGID PAPER BOXES: Through the first 11 months of 1983, set-up box producers reported an increase of some 10% from last year's grand total billings, with rising margins as 1983 business was well-sustained in late months. All eight of the National Paperbox & Packaging area divisions are above last year's level, with marked improvement in the Midwest industrial sectors—which had the furthest to go from doldrums. A bit of good news is that average price per shipped ton has improved somewhat beyond the present degree of dollar inflation. But tonnage continues down.

For more information on Specialty Equipment Co., Circle No. 148 on Reader Inquiry Card→

1984
Buying Forecast

This will undoubtedly be the best business year the paperboard converting industry will have experienced in a long time.

No matter how hard one looks for weak spots in the nation's economic foundation, there are very few, if any, that have to be worried about this year. And with packaging so closely tied to the ebbs and flows of the economy, this portends good news for suppliers and boxmakers alike in an election year.

It's important to remember, however, that after Nov. 6 all bets for continued prosperity into 1985 and beyond might have to be called off. Naturally, only time will tell. In the mean time, the economic picture looks extremely bright indeed. A year ago the big concern was high interest rates and while the prime rate (currently at 11%) might edge up a little in the next six months or so, it has remained pretty stable the past six months and really can't be considered as threatening as it once was. It also has to be remembered that when something (like historically high interest rates) has been around for a long time, businesses have a tendency to get used to it, whether they like to admit it or not.

The wide array of positive economic signs includes the fact that the wholesale inflation rate has reached its lowest annual mark in 20 years and that unemployment keeps falling. It could be as low as 7.5% in another few months. Other encouraging notes include rising retail sales, more overtime at our nation's factories and housing starts almost 50% greater than 1982. Of course, when one realizes that 1983 figures are being compared to a (deep) recession year, that takes off some of the gloss. Finally, and probably most importantly, personal incomes, after taxes, are growing faster than prices. This means that wallets and purses will be opening up with much greater frequency in the months ahead, and this is directly attributable to the best Christmas selling season in four years.

Of course, as is well known by now, if businesses aren't willing to spend for capital goods, the economy withers like grapes on a vine. There's good news to report here, too. According to the Economic Unit of *U.S. News and World Report*, this year's pickup will amount to "possibly 10%—or 6% after adjustment for inflation." No boom, but when one thinks about it, a boom could do more damage (higher inflation) than good. Moderation will be the key to long-term economic stability, so when the Commerce Department or Labor Department comes out with figures that aren't always on a downward trend, it does not automatically mean it's time to panic.

The general business community will raise its investment in plant and equipment by 5-8%, after inflation, this year, compared to a 1-2% *decline* last year.

The '84 Forecast on U.S. corrugated, folding carton and rigid box manufacturers was written by Mark Arzoumanian, editor, Paperboard Packaging; *Fred Sharring, senior editor,* Paperboard Packaging; *and Norm Baldwin, executive director, NP&PA.*

Business upturn

"The best is yet to come," says the president of one independent box plant. "My customers are cautiously optimistic and we're planning for some major capital investments to take advantage of the upturn in business."

Corrugated and Solid Fibre Boxes (SIC 2653): Trends and Projections 1972-84

(in millions of dollars except as noted)

Item	1972	1977	1979	1981	1982(1)	1983(2)	Compound annual rate of growth 1972-83	1984(3)	Percent change 1983-84
Industry data									
Value of shipments[4]	4,308.8	7,351.1	8,975.9	10,760.3	11,065.0	11,065.0	9.0		
Value of shipments (1972 $)	4,308.8	4,619.0	5,094.8	5,133.7	5,148.0	5,148.0	1.6	5,380.0	4.5
Total employment (000)	107.9	101.5	103.7	97.3	93.9	93.9	−1.3	95.9	2.1
Production workers (000)	80.6	73.5	75.5	69.5	67.4	67.4	−1.6	69.2	2.6
Average hourly earnings of production workers ($)	3.88	5.92	6.91	8.69	9.13	9.13	8.12		
Capital expenditures	101.5	243.3	303.0						
Product data									
Value of shipments[5]	4,196.9	7,182.8	8,686.9	10,495.9	10,087.0	10,793.0	9.0		
Value of shipments (1972 $)[5]	4,196.9	4,499.1	4,962.5	5,007.6	4,782.0	5,021.0	1.6	5,247.0	4.5
Product price index (1972=100)	100.0	146.4	173.1	209.6	210.8	215.0	7.2		
Quantity shipped (unit of measure)	211.9	227.2	250.6	246.2	235.2	247.0	1.4	258.0	4.5
Trade									
Value of exports	8.3	34.0	49.0	64.4	68.4	72.5	21.8	77.6	7.0
Export/shipments ratio	0.002	0.005	0.006	0.006	0.007	0.006	10.616		

[1] Estimated except for product price index, exports, and imports.
[2] Estimated.
[3] Forecast.
[4] Value of all products and service sold by industry SIC 2653.
[5] Value of shipments of corrugated and solid fiber box products produced by all industries.
[6] New supply is the sum of product shipments plus imports.

Source: Bureau of the Census and Bureau of Industrial Economics. Estimates and forecasts by the Bureau of Industrial Economics.

A recent survey conducted by the National Association of Business Economists resulted in some noteworthy conclusions. Among them, 41% of these economists believe the next business recession will begin as soon as next year, while 31% believe it will start in 1986 and 19% in 1987 or later. Also, 41% believe the prime bank lending rate will be moderately higher this year. One can conclude that this year could very well be the peak business year of the 1980s. The remaining six years could be a real economic roller coaster if something isn't done about the $200 billion budget deficit that to date the Reagan Administration has not been able to put a lid on, never mind reduce. President Reagan won't do anything until after Election Day, so right now things are going to remain in limbo. Cutting taxes has obviously not been a cure and government spending keeps going up and up. Giving the deficit dilemma some historical perspective, it must be pointed out that federal outlays, as a percentage of GNP, have been rising at an annual rate of 1.8% since 1970 and since 1979 have gone up to 4.6%. Deficits didn't start with Reagan, and the passage of the Congressional Budget and Impoundment Control Act of 1974, which severely limited the president's power to control spending, certainly doesn't help matters.

Something has to be done about this deficit. All a tax increase will do is finance more government spending. The key question remains whether the government's share of the economy should be allowed to become larger than it already is. To think that we, as a nation, can continue to live with this deficit hovering over our collective heads is utterly ridiculous.

In conclusion, if the paperboard converting industry can't make money this year, something is fundamentally wrong. Growth will be steady throughout the year and that means that *everyone* will benefit, to one degree or another. Remember, though: business rarely walks through the door, and only those who are continuously aggressive and innovative will be able to prevent it from walking out the door in 1985 and beyond.

Corrugated Boxmakers All Agree: Sales Will Be Up

Industry saw a 5% year-to-year gain in real growth, largest in six years.

After talking to dozens of box plant executives and key suppliers to the corrugated container industry, the conclusion can be summed up in a song from the Broadway musical "Gypsy": "Everything's Coming Up Roses."

"I'm very enthusiastic about business," says the general manager of an East Coast box plant. "It was slow during the (past) summer but it has been building up the past two to three months. Our phones are ringing heavy and I expect things to really take off now."

Probably the best example of a company committing itself to the future of this industry is found in Mead Containers. By the end of this year it is scheduled to complete a $23 million capital investment program to improve technology and cost-effectiveness at two corrugated container plants. The St. Joseph, Mo., plant and Mead's Atlanta/Covington, Ga., facility will be expanded to accommodate new corrugating machines and material handling and converting equipment.

However, the other side of the coin cannot be ignored: plant shutdowns and mergers. The latter trend manifests itself in Canada's MacMillan Bathurst, which really amounted to a logical pooling of resources. Unfortunately—or perhaps for overall industry profitability, fortunately—the trend toward consolidation will continue for another 15 to 20 years as more and more integrateds realize that profit must be king—no ifs, ands or buts.

Record highs

Although this was written before the end of 1983, based on reports from the Fibre Box Association during October and November, there is a very good chance that a new record of 252 billion sq ft will have been set, beating the previous high of 250.643 set in 1979. *Paperboard Packaging* estimates a 1983 industry sales volume of $12.5 billion (in today's dollars).

Norma Pace, senior vice president, American Paper Institute, speaking at the Association of Independent Corrugated Converters' Fall Meeting, gave a very upbeat report, concluding that '84 is going to be a "great year." She noted that the Federal Reserve will "stay on a neutral course, keeping interest rates at moderate levels" and that this year box shipments will advance 6.3%. She also predicted 270 billion sq ft of board will be produced this year.

According to the U.S. Department of Commerce's Office of Basic Industries, current major end-user markets for corrugated boxes include stone, clay and glass products, electrical machinery and equipment and lumber and wood products. Principal nondurable end-user markets include food and beverages, paper and allied products, rubber and plastics, and chemicals and allied products.

Continuing technological developments in the corrugated container industry include the steady increase of computers and computer software programs, a long-overdue trend; the improvement of color printing techniques, especially with regards to point-of-purchase displays; a steady rise in the use of preprinted linerboard; the improvement of in-plant material handling systems; and employment of better moisture control in containerboard raw materials to increase productivity.

Without a doubt, this will be a banner year for the corrugated container industry in the United States. In Europe, the situation is more of a mixed bag; certain countries are just now starting to see their economies pick up (with a corresponding rise in container production) while others are still mired in the throes of deep recession. Box plants throughout the world now realize that staying lean and competitive will not only mean survival but, if they play their cards right, a bigger bottom line for this year and beyond. The key will be passing valued-added costs to the customer, who for too long has considered an RSC to be this industry's only commodity. Such thinking has been drastically altered with the introduction of greatly improved graphics, printing materials and finishing equipment.

All Major Equipment figures in this forecast are computer-tabulated and based on responses to questionnaires sent to box plants in compiling the Fall 1983 Official Container Directory.

Total United States

Major Equipment

Corrugating plants	612
Sheet plants	713
Corrugators	655
Independent single facers	139
Letterpress printer-slotters	2121
Flexo printer-slotters	787
Flexo folder-gluers	1150
Folder-gluers	627
Infold gluers	75
Tapers & folder tapers	2046
Stitchers & folder stitchers	1479
Diecutters, platen jaw	646
Diecutters, flat bed reciprocating	470
Diecutter stations, rotary	750
Wax impregnators, corr. coaters	385
Curtain coaters	218
Laminators	495
Unitizers & load strappers	1148
Bundle tyers	1720
Computers	588

Estimated Expenditures

Materials

Corrugating adhesives	$111,130,240
Printing inks	90,810,720
Waxes & coatings	98,142,720
Adhesives, synth. resins	16,573,440
Jointing tapes	26,457,600
Stitch wire & staples	6,789,120

Supplies

Printing plates & dies	49,786,880
Cutting rule & dies	36,774,400
Pallet materials	30,151,680
Twine	5,291,520
Strapping: steel & plastic	21,166,080
Baling	2,296,320
Oil & lubricants	10,583,040
Maintenance	27,156,480

South Atlantic

MARYLAND
DEL
WEST VIRGINIA
VIRGINIA
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA

Major Equipment

Corrugating plants	95
Sheet plants	83
Corrugators	99
Independent single facers	13
Letterpress printer-slotters	274
Flexo printer-slotters	138
Flexo folder-gluers	169
Folder-gluers	108
Infold gluers	3
Tapers & folder tapers	268
Stitchers & folder stitchers	201
Diecutters, platen jaw	52
Diecutters, flat bed reciprocating	57
Diecutter stations, rotary	104
Wax impregnators, corr. coaters	76
Curtain coaters	32
Laminators	44
Unitizers & load strappers	162
Bundle tyers	204
Computers	77

Estimated Expenditures

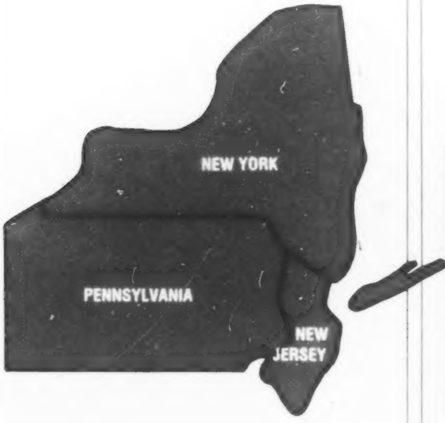
Materials

Corrugating adhesives	$17,096,664
Printing inks	13,372,559
Waxes & coatings	16,980,787
Adhesives, synth. resins	2,338,253
Jointing tapes	3,618,202
Stitch wire & staples	1,004,390

Supplies

Printing plates & dies	8,491,226
Cutting rule & dies	3,817,112
Pallet materials	4,638,566
Twine	655,949
Strapping: steel & plastic	3,052,109
Baling	353,234
Oil & lubricants	1,628,091
Maintenance	4,178,304

Middle Atlantic



Major Equipment

Corrugating plants	118
Sheet plants	132
Corrugators	127
Independent single facers	45
Letterpress printer-slotters	429
Flexo printer-slotters	139
Flexo folder-gluers	201
Folder-gluers	113
Infold gluers	10
Tapers & folder tapers	391
Stitchers & folder stitchers	281
Diecutters, platen jaw	107
Diecutters, flat bed reciprocating	99
Diecutter stations, rotary	123
Wax impregnators, corr. coaters	78
Curtain coaters	23
Laminators	98
Unitizers & load strappers	187
Bundle tyers	283
Computers	100

Estimated Expenditures

Materials

Corrugating adhesives	$20,836,920
Printing inks	17,218,000
Waxes & coatings	13,095,014
Adhesives, synth. resins	3,055,104
Jointing tapes	4,990,003
Stitch wire & staples	1,283,942

Supplies

Printing plates & dies	8,657,334
Cutting rule & dies	7,393,776
Pallet materials	5,652,941
Twine	862,618
Strapping: steel & plastic	3,754,982
Baling	430,510
Oil & lubricants	1,983,821
Maintenance	5,091,840

New England

MAINE
NEW HAMPSHIRE
VERMONT
MASSACHUSETTS
CONNECTICUT
RHODE ISLAND

Major Equipment

Corrugating plants	35
Sheet plants	49
Corrugators	39
Independent single facers	14
Letterpress printer-slotters	140
Flexo printer-slotters	45
Flexo folder-gluers	57
Folder-gluers	28
Infold gluers	1
Tapers & folder tapers	152
Stitchers & folder stitchers	116
Diecutters, platen jaw	46
Diecutters, flat bed reciprocating	33
Diecutter stations, rotary	32
Wax impregnators, corr. coaters	21
Curtain coaters	4
Laminators	38
Unitizers & load strappers	67
Bundle tyers	107
Computers	34

Estimated Expenditures

Materials

Corrugating adhesives	$7,123,418
Printing inks	5,836,230
Waxes & coatings	4,604,621
Adhesives, synth. resins	1,013,088
Jointing tapes	1,938,893
Stitch wire & staples	506,688

Supplies

Printing plates & dies	3,125,408
Cutting rule & dies	2,344,368
Pallet materials	1,931,904
Twine	347,443
Strapping: steel & plastic	2,374,195
Baling	147,164
Oil & lubricants	678,413
Maintenance	1,740,710

East North Central

WISCONSIN
MICHIGAN
ILLINOIS
INDIANA
OHIO

Major Equipment

Corrugating plants	152
Sheet plants	222
Corrugators	158
Independent single facers	33
Letterpress printer-slotters	582
Flexo printer-slotters	181
Flexo folder-gluers	285
Folder-gluers	152
Infold gluers	21
Tapers & folder tapers	577
Stitchers & folder stitchers	422
Diecutters, platen jaw	193
Deicutters, flat bed reciprocating	99
Diecutter stations, rotary	197
Wax impregnators, corr. coaters	117
Curtain coaters	43
Laminators	150
Unitizers & load strappers	314
Bundle tyers	449
Computers	149

Estimated Expenditures

Materials

Corrugating adhesives	$29,029,312
Printing inks	24,373,949
Waxes & coatings	22,161,484
Adhesives, synth. resins	4,543,718
Jointing tapes	7,732,608
Stitch wire & staples	1,996,800

Supplies

Printing plates & dies	12,280,153
Cutting rule & dies	10,008,648
Pallet materials	7,876,378
Twine	1,431,706
Strapping: steel & plastic	6,309,894
Baling	600,038
Oil & lubricants	2,764,570
Maintenance	7,093,632

West North Central

NORTH DAKOTA
MINNESOTA
SOUTH DAKOTA
NEBRASKA
IOWA
KANSAS
MISSOURI

Major Equipment

Corrugating plants	49
Sheet plants	51
Corrugators	51
Independent single facers	10
Letterpress printer-slotters	162
Flexo printer-slotters	71
Flexo folder-gluers	81
Folder-gluers	54
Infold gluers	21
Tapers & folder tapers	170
Stitchers & folder stitchers	98
Diecutters, platen jaw	70
Diecutters, flat bed reciprocating	46
Diecutter stations, rotary	77
Wax impregnators, corr. coaters	43
Curtain coaters	33
Laminators	38
Unitizers & load strappers	107
Bundle tyers	149
Computers	50

Estimated Expenditures

Materials

Corrugating adhesives	$6,411,538
Printing inks	4,718,314
Waxes & coatings	7,338,240
Adhesives, synth. resins	969,828
Jointing tapes	1,630,387
Stitch wire & staples	330,470

Supplies

Printing plates & dies	2,406,061
Cutting rule & dies	2,374,424
Pallet materials	1,739,213
Twine	340,454
Strapping: steel & plastic	1,365,512
Baling	132,488
Oil & lubricants	610,522
Maintenance	1,566,490

East South Central

KENTUCKY
TENNESSEE
MISSISSIPPI
ALABAMA

Major Equipment

Corrugating plants	36
Sheet plants	41
Corrugators	40
Independent single facers	2
Letterpress printer-slotters	142
Flexo printer-slotters	48
Flexo folder-gluers	62
Folder-gluers	45
Infold gluers	6
Tapers & folder tapers	131
Stitchers & folder stitchers	87
Diecutters, platen jaw	38
Diecutters, flat bed reciprocating	20
Diecutter stations, rotary	51
Wax impregnators, corr. coaters	26
Curtain coaters	18
Laminators	28
Unitizers & load strappers	73
Bundle tyers	79
Computers	36

Estimated Expenditures

Materials

Corrugating adhesives	$6,945,640
Printing inks	5,838,653
Waxes & coatings	6,331,853
Adhesives, synth. resins	1,076,275
Jointing tapes	1,655,347
Stitch wire & staples	420,326

Supplies

Printing plates & dies	3,180,320
Cutting rule & dies	2,133,976
Pallet materials	1,883,981
Twine	259,584
Strapping: steel & plastic	1,445,683
Baling	143,470
Oil & lubricants	661,440
Maintenance	1,697,280

West South Central

OKLAHOMA
ARKANSAS
TEXAS
LOUISIANA

Major Equipment

Corrugating plants	49
Sheet plants	53
Corrugators	51
Independent single facers	10
Letterpress printer-slotters	163
Flexo printer-slotters	72
Flexo folder-gluers	91
Folder-gluers	44
Infold gluers	11
Tapers & folder tapers	148
Stitchers & folder stitchers	110
Diecutters, platen jaw	33
Diecutters, flat bed reciprocating	28
Diecutter stations, rotary	74
Wax impregnators, corr. coaters	41
Curtain coaters	37
Laminators	38
Unitizers & load strappers	101
Bundle tyers	140
Computers	52

Estimated Expenditures

Materials

Corrugating adhesives	$9,439,144
Printing inks	7,312,105
Waxes & coatings	11,943,859
Adhesives, synth. resins	1,287,936
Jointing tapes	2,099,635
Stitch wire & staples	588,106

Supplies

Printing plates & dies	3,954,579
Cutting rule & dies	2,765,152
Pallet materials	2,560,896
Twine	452,275
Strapping: steel & plastic	2,349,235
Baling	194,688
Oil & lubricants	898,860
Maintenance	2,306,304

Mountain

MONTANA
IDAHO
WYOMING
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO

Major Equipment

Corrugating plants	11
Sheet plants	17
Corrugators	10
Independent single facers	2
Letterpress printer-slotters	34
Flexo printer-slotters	17
Flexo folder-gluers	24
Folder-gluers	16
Infold gluers	1
Tapers & folder tapers	37
Stitchers & folder stitchers	30
Diecutters, platen jaw	11
Diecutters, flat bed reciprocating	10
Diecutter stations, rotary	13
Wax impregnators, corr. coaters	4
Curtain coaters	7
Laminators	12
Unitizers & load strappers	20
Bundle tyers	44
Computers	14

Estimated Expenditures

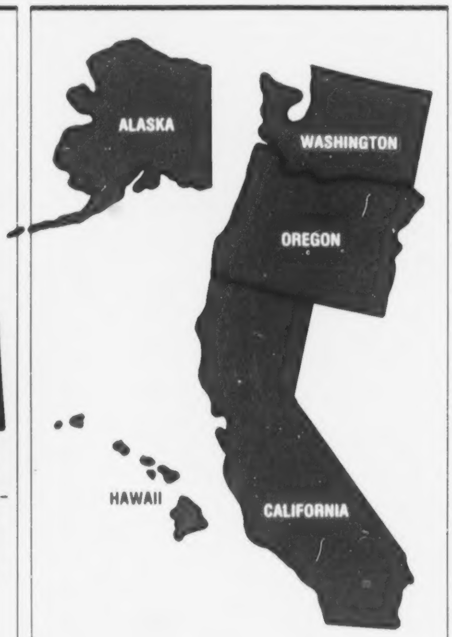
Materials

Corrugating adhesives	$1,423,760
Printing inks	1,676,875
Waxes & coatings	826,618
Adhesives, synth. resins	391,872
Jointing tapes	469,348
Stitch wire & staples	115,814

Supplies

Printing plates & dies	1,189,302
Cutting rule & dies	837,590
Pallet materials	386,381
Twine	132,787
Strapping: steel & plastic	280,550
Baling	28,954
Oil & lubricants	135,683
Maintenance	347,443

Pacific



Major Equipment

Corrugating plants	67
Sheet plants	65
Corrugators	80
Independent single facers	10
Letterpress printer-slotters	195
Flexo printer-slotters	76
Flexo folder-gluers	180
Folder-gluers	67
Infold gluers	1
Tapers & folder tapers	172
Stitchers & folder stitchers	137
Diecutters, platen jaw	96
Diecutters, flat bed reciprocating	78
Diecutter stations, rotary	79
Wax impregnators, corr. coaters	79
Curtain coaters	21
Laminators	49
Unitizers & load strappers	117
Bundle tyers	265
Computers	76

Estimated Expenditures

Materials

Corrugating adhesives	$12,822,305
Printing inks	10,599,388
Waxes & coatings	14,533,708
Adhesives, synth. resins	1,932,902
Jointing tapes	2,322,278
Stitch wire & staples	588,058

Supplies

Printing plates & dies	6,776,141
Cutting rule & dies	4,282,980
Pallet materials	3,478,426
Twine	806,707
Strapping: steel & plastic	2,088,653
Baling	264,576
Oil & lubricants	1,221,043
Maintenance	3,132,979

Folding Carton Industry Faces Tough Competition

The key to growth is in exploiting new market areas made available as a result of changing social trends.

What growth opportunities can be looked forward to by a U.S. folding carton industry that must look back on a decades-long drop in per-person use of that product?

To judge from some cheery predictions, a steady and vigorous expansion is to be expected over the near future, and thereafter. Such forecasts rarely state a plausible basis for this belief. To judge from the stark facts of annual production tonnage, any growth potential must lie in holding the present share of existing uses as well as possible, while identifying and entering new applications.

It may well be said that this has always been the case. Indeed it has, but the case has not always included such a wide and successful array of alternate, new-fangled packagings, presented and promoted by such an alert and vigorously innovative array of producers.

However it may be sliced and scrutinized, the fact remains that total U.S. shipments of folding cartons today are below the tonnage of 10 years ago, while population has of course risen. The effect and extent of this is that in the year just past, the average American called for precisely 10% less folding carton product than in 1973.

It can't take many more years of such an attrition level to transform the whole posture and prominence of folding cartons. Already, in only the latest half of that same decade, nearly 10% of the industry's plants have gone out of business—for reasons far removed from the normal perception of antiquated, marginal business.

It may be that a significant further number of the more-precariously situated carton operations will also go under before some sort of equilibrium is reached in demand/supply. It is sophistry to say that this point will come sooner if effective steps are taken. The question clearly is—what steps are those?

Price is not the answer, as already demonstrated. The value of shipped folding cartons went up 115% in the aforesaid decade just past, according to their producers' announcement, which in this case becomes more in the nature of an admission. Yet the folding fold-up has continued.

It seems logical, then, that stabilizing the industry's fortunes might better lie in seeking new package outlets, rather than in grim struggle to contend for existing uses. The latter have been under attack for years by plastics and various other alternative applications. It would seem that where these carton markets can be lost, they have largely been lost already. On the other hand, shifts and evolutions in social patterns are calling for species of contents and packages never before demanded in any great volume.

These changes include the expanding number of two-income households, and of single-person households, increasing affluence among the 90% employed, greater variety of leisure diversions, more-widespread concern with personal health, and an aging population, among other factors.

Convenience eating

As prominent as any among these evolutions is our national eating habits. Foodstuffs, in one form or another, currently claim more than 50% of all packagings produced on carton converting equipment.

The need for single-portion or other small packages offers a fertile field for carton innovations—by a fraternity that has proved itself highly receptive. The 1980 Census showed an increase in single-person home occupancy of more than 60% over '70, along with a lesser but still significant rise in two-person homes, and in husbands/wives on work schedules of different times. A good part of the latter have at-home children who require nourishing but quickly prepared meals.

Foodstuffs, in one form or another, currently claim more than 50% of all packagings produced on carton converting equipment.

Two major selling points for small-portion units are that a greater variety of foods can be purchased to suit personal tastes, and that the waste-potential of larger quantities is reduced. For an example, senior citizens on budgeted incomes are likely to accept the small additional unit cost for two single-serving packages, or a single two-serving purchase, rather than eat alternate meals of fresh foods and leftovers from one "economy size" box.

Even in the younger sector, where cost may be a less immediate problem, undue waste remains objectionable to most Americans, yet the time taken for assembling and contriving a meal from leftovers defeats the purpose of the single-service food.

In addition to the growing at-home demand for individual servings, the "eating out" syndrome is an expanding outlet for similarly small containers. Market

The exclusive, patented

DAYCO DIAMOND-LOC®
DIE-CUTTING MAT
CUTS ROTATION TIME
IN HALF!

One man can rotate an entire roll face in less than 20 minutes. No mat on the market today can match Diamond Loc for speed and ease of installation and/or removal. So easy, you can change mats while you change dies—to eliminate costly down-time.

Or rotate just one mat, without disturbing adjacent mats. For example, let's say you have a critical wear problem on only one mat caused by failure of the oscillating system. No problem. With Diamond Loc, zip, it's out. Turn it around. Pop, it's back in place. Without bothering adjacent mats. You save production time—and get additional use of the damaged mat.

You'll probably use fewer mats. Since no screws are needed to hold a Diamond Loc mat in place, you can easily adjust mats to cover just the cutting area. There's no need to cover the entire roll face.

More than a proven timesaver. By encouraging more frequent rotation, Diamond Loc prolongs mat life, saving you money on replacement costs, too.

For a free folder describing Diamond Loc mats, call 513/226-5866. Or write Dayco Corporation, Printing Products Division, 333 West First Street, Dayton, OH 45402

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PRINTING PRODUCTS DIVISION
DAYTON, OHIO 45401

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Circle No. 115 on Reader Inquiry Card

F[illegible] Paperboard Boxes (SIC 2651): Trends and Projections 1972-83

(in millions of dollars except as noted)

Item	1972	1977	1979	1981	1982[1]	1983[2]	Compound annual rate of growth 1972-83	1984[3]	Percent Change 1983-84
Industry data									
Value of shipments[4]	1,487.0	2,579.0	2,950.0	3,556.8	3,848.3	3,983.0	9.4		
Value of shipments (1972 $)[4]	1,487.0	1,553.9	1,617.9	1,652.0	1,623.9	1,648.0	0.9	1,681.0	
Total employment (000)	45.3	44.7	45.0	44.3	42.4	43.0	−0.5	44.0	
Production workers (000)	36.5	35.8	36.1	35.5	33.8	34.3	−0.6	35.1	
Average hourly earnings of									2.0
production workers ($)	3.90	5.71	6.40	7.50	8.12	8.86	7.76		2.3
Capital expenditures	37.4	89.8	76.8	100.9					2.2
Product data									
Value of shipments[5]	1,372.1	2,393.4	2,797.6	3,415.0	3,695.0	3,824.0	9.8		
Value of shipments (1972 $)[5]	1,372.1	1,433.8	1,492.9	1.598.0	1,571.0	1,595.0	1.4	1,627.0	2.0
Product price index (1972=100)	100.0	127.4	132.9	213.7	234.8	239.5	8.3		
Quantity shipped (1000 short tons)	2,525.0	2,639	2,748	2,652.0	2.607.0	2,646.0	0.4	2,700.0	2.0
Trade									
Value of exports	5.9	13.0	20.6	26.4	27.8	29.5	15.8	32.5	10.2
Value of imports	5.0	10.0	14.8	17.7	15.0	16.5	11.5	17.5	6.1
Export/shipments ratio	0.004	0.005	0.007	0.008	0.008	0.009	6.945		
Import/new supply ratio[6]	0.004	0.001	0.005	0.005	0.004	0.005			

[1] Estimated except for product price index, exports, and imports.
[2] Estimated.
[3] Forecast.
[4] Value of all products and services sold by industry SIC 2651.
[5] Value of shipments of folding paperboard box.
[6] New supply is the sum of product shipments plus imports.

Source: Bureau of the Census and Bureau of Industrial Economics. Estimates and forecasts by the Bureau of Industrial Economics.

researchers report that over the past 10-odd years the percentage of food that is purchased for home preparation has fallen from 85 to 60 percent of the total. In fact, this decline has posed a formidable financial problem for supermarkets geared to the previous volume of sales. Their loss is the cartons' gain.

These two outlets, then—the home-use retail carton and the simple fast-food convenience container—afford two distinct opportunities in carton conversion. The first lends itself to competitive graphics, box design and other traditional factors of visual appeal. The second adopts to no-nonsense conversion into basic hamburger trays, french-fry cups and related high-volume packagings that demand little or no time on printing, embossing or other decorative plant equipment.

A further advantage, here, is that the contents' appeal is to a great extent one of the quantity, rather than of alluring package design. This tends to moderate the need for primary concern with box sophistication, and also to permit use of less expensive boards. When the ton-cost differential of beloved solid bleached sulfate board becomes 60% greater than simple white-lined recycled sheet, the boxmaker's affection is happy to defer to his finances. This, in turn, advances his competitivity against the alternate packagings.

Plastics tailing off

Plastics indeed have entered the arena, but evidences appear that public fascination with those materials is wearing off, and in fact is being replaced by a certain resentment. Professional supermarket publications have remarked that the plastic carryout bag has been discontinued by many stores, because of low popularity, that the molded-foam egg carton is seeing a comeback by the molded pulp and compartmented paperboards, and that the plastic dairy-product containers are losing once-gained ground to waterproofed paperboard.

Among findings from consumer interviews are that plastics have been found irritably difficult to dispose of, and that the householder who is stunned by the preposterous current price of plastic garbage bags suddenly conjectures what the cost of those grocery tote-outs is probably adding to her food bill. Furthermore, a growing segment of the perceiving public reports that throwaway-use of petrochemical derivatives is a "pet peeve"—when renewable paper is available. Those views can be an advantage to the cartonmaker.

Elsewhere among the "trend" advantages is that of convenience packaging for home preparation. The ovenable paperboards and the retort pouches, for examples, are no longer latest concepts, but they remain potent prospects for growth in our evolving social scene.

Both of the major expanding population groups—the active young businesspeople and the senior citizens—incline to avoid giving overmuch attention to such distractions as cooking and dishwashing. The former grudge the

(continued on page 41)

Total United States

Major Equipment

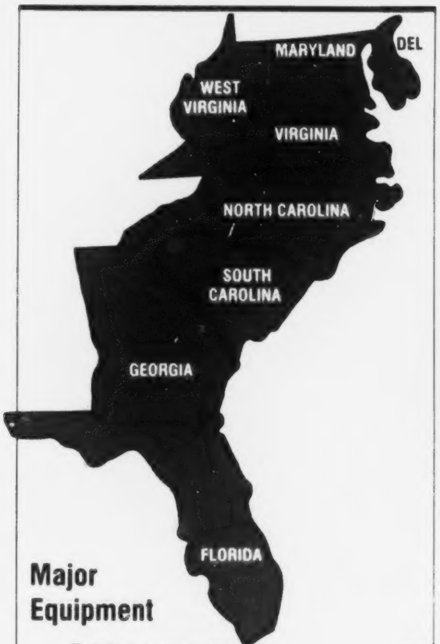
Folding carton plants	562
Cutters & creasers	2401
Letterpress printing presses	752
Offset printing presses	1977
Offset: up to 3 colors	300
Offset: over 3 colors	368
Offset: up to 60″	420
Offset: over 60″	140
Dry offset or letterset	104
Flexographic printing presses	218
Gravure printing presses	132
Gluers, timed	773
Gluers, untimed	1112
Waxers & waxing attachments	330
Laminators	128
Sheet cutters, guillotine	471
Sheeters, web fed	237
Corr. boxmaking equipment	57
Case sealers	265
Computers	145

Estimated Expenditures

Specialty papers	$65,098,800
Ink	127,561,200
Waxes & coatings	21,294,000
Corrugated containers	76,050,000
Die materials	24,843,000
Press plates, print supplies	114,987,600
Adhesives	28,087,800
Embossing foils	19,063,200
Tapes	4,461,600
Maintenance materials	51,004,200

For more information on MHI Corrugating Machinery Co., Circle No 135 on Reader Inquiry Card

South Atlantic



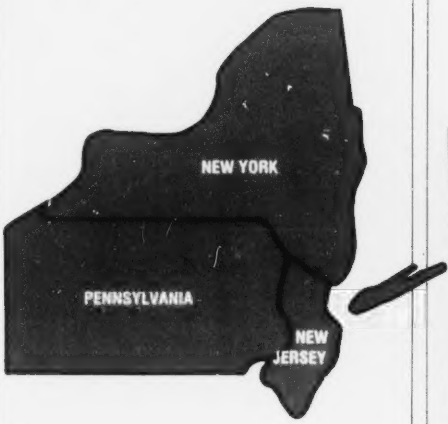
Major Equipment

Folding carton plants	69
Cutters & creasers	295
Letterpress printing presses	60
Offset printing presses	213
Offset: up to 3 colors	35
Offset: over 3 colors	41
Offset: up to 60″	46
Offset: over 60″	7
Dry offset or letterset	10
Flexographic printing presses	32
Gravure printing presses	21
Gluers, timed	121
Gluers, untimed	126
Waxers & waxing attachments	60
Laminators	12
Sheet cutters, guillotine	53
Sheeters, web fed	36
Corr. boxmaking equipment	6
Case sealers	35
Computers	16

Estimated Expenditures

Specialty papers	$4,998,006
Ink	9,795,240
Waxes & coatings	3,502,356
Corrugated containers	5,839,626
Die materials	2,157,792
Press plates, print supplies	10,448,256
Adhesives	2,846,298
Embossing foils	1,464,216
Tapes	342,732
Maintenance materials	6,820,398

Middle Atlantic



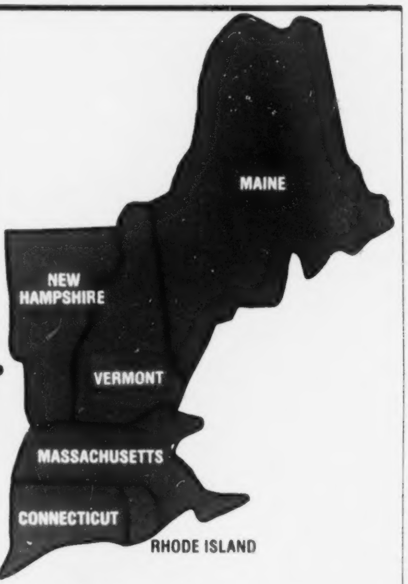
Major Equipment

Folding carton plants	126
Cutters & creasers	632
Letterpress printing presses	243
Offset printing presses	519
Offset: up to 3 colors	68
Offset: over 3 colors	99
Offset: up to 60″	107
Offset: over 60″	36
Dry offset or letterset	49
Flexographic printing presses	31
Gravure printing presses	35
Gluers, timed	196
Gluers, untimed	296
Waxers & waxing attachments	81
Laminators	30
Sheet cutters, guillotine	122
Sheeters, web fed	34
Corr. boxmaking equipment	10
Case sealers	55
Computers	27

Estimated Expenditures

Specialty papers	$18,627,180
Ink	36,499,944
Waxes & coatings	4,461,600
Corrugated containers	21,760,440
Die materials	6,943,872
Press plates, print supplies	38,937,600
Adhesives	7,757,100
Embossing foils	5,455,320
Tapes	1,276,626
Maintenance materials	25,532,520

New England



Major Equipment

Folding carton plants	55
Cutters & creasers	265
Letterpress printing presses	99
Offset printing presses	168
Offset: up to 3 colors	22
Offset: over 3 colors	31
Offset: up to 60″	35
Offset: over 60″	13
Dry offset or letterset	16
Flexographic printing presses	9
Gravure printing presses	2
Gluers, timed	60
Gluers, untimed	105
Waxers & waxing attachments	25
Laminators	15
Sheet cutters, guillotine	43
Sheeters, web fed	20
Corr. boxmaking equipment	5
Case sealers	19
Computers	12

Estimated Expenditures

Specialty papers	$6,743,100
Ink	10,829,520
Waxes & coatings	1,411,488
Corrugated containers	82,641,000
Die materials	2,702,310
Press plates, print supplies	2,697,240
Adhesives	2,602,938
Embossing foils	1,617,330
Tapes	378,222
Maintenance materials	7,574,279

spare time; the latter lack energy. For them, the appeal of stick-it-in-the-microwave-and-throw-away-the-box is likely to offer market prospects greater than their numerical increase. This younger group is not to be confused with the coke-and-pizza set, nor are these seniors those who require nursing service. Both sectors have reasonably refined adult tastes, and an appreciation of variety. This, together with their smaller-portion proclivity, spells a worthwhile potential for volume and diversity of the needed retail boxes.

Health concerns

Another trend conducive to packaging prosperity is the "health" preoccupation already

East North Central

WISCONSIN
MICHIGAN
ILLINOIS
INDIANA
OHIO

Major Equipment

Folding carton plants	139
Cutters & creasers	612
Letterpress printing presses	212
Offset printing presses	521
Offset: up to 3 colors	79
Offset: over 3 colors	95
Offset: up to 60″	105
Offset: over 60″	49
Dry offset or letterset	17
Flexographic printing presses	57
Gravure printing presses	51
Gluers, timed	167
Gluers, untimed	282
Waxers & waxing attachments	73
Laminators	44
Sheet cutters, guillotine	112
Sheet cutters, web fed	60
Corr. boxmaking equipment	17
Case sealers	70
Computers	37

Estimated Expenditures

Specialty papers	$17,104,152
Ink	33,516,756
Waxes & coatings	5,124,756
Corrugated containers	19,266,000
Die materials	5,957,250
Press plates, print supplies	35,753,640
Adhesives	6,731,946
Embossing foils	5,009,160
Tapes	1,172,184
Maintenance materials	23,322,000

West North Central

NORTH DAKOTA
MINNESOTA
SOUTH DAKOTA
NEBRASKA
IOWA
KANSAS
MISSOURI

Major Equipment

Folding carton plants	57
Cutters & creasers	202
Letterpress printing presses	40
Offset printing presses	159
Offset: up to 3 colors	30
Offset: over 3 colors	25
Offset: up to 60″	32
Offset: over 60″	10
Dry offset or letterset	0
Flexographic printing presses	27
Gravure printing presses	5
Gluers, timed	42
Gluers, untimed	82
Waxers & waxing attachments	20
Laminators	8
Sheet cutters, guillotine	40
Sheeters, web fed	21
Corr. boxmaking equipment	8
Case sealers	20
Computers	14

Estimated Expenditures

Specialty papers	$5,701,722
Ink	11,172,252
Waxes & coatings	1,920,516
Corrugated containers	6,659,952
Die materials	2,092,896
Press plates, print supplies	11,918,556
Adhesives	2,171,988
Embossing foils	1,669,040
Tapes	390,390
Maintenance materials	7,814,898

East South Central

KENTUCKY
TENNESSEE
MISSISSIPPI
ALABAMA

Major Equipment

Folding carton plants	28
Cutters & creasers	84
Letterpress printing presses	12
Offset printing presses	66
Offset: up to 3 colors	7
Offset: over 3 colors	10
Offset: up to 60″	17
Offset: over 60″	1
Dry offset or letterset	0
Flexographic printing presses	14
Gravure printing presses	5
Gluers, timed	42
Gluers, untimed	43
Waxers & waxing attachments	7
Laminators	2
Sheet cutters, guillotine	12
Sheeters, web fed	14
Corr. boxmaking equipment	4
Case sealers	5
Computers	7

Estimated Expenditures

Specialty papers	$2,674,932
Ink	5,241,366
Waxes & coatings	564,798
Corrugated containers	3,125,148
Die materials	783,900
Press plates, print supplies	1,432,210
Adhesives	1,227,954
Embossing foils	783,822
Tapes	183,534
Maintenance materials	3,666,624

being strongly publicized and promoted. Some of this publicity borders on an exploitative jargon, such as the caffeine-free claim for foods that never contained it, and the sugar-free status attained at the expense of innocent glucose by substituting possible carcinogens. However, much of the widening concern with improved nourishment and controlled diet is legitimate and laudible.

Professional projections have been made that the field of specialized diet offers an inviting, high-volume outlet to food manufacturers (and, thus, to packagers). It is pointed out that significant segments, not limited to older groups, share one or another common physical state that is controlled by

West South Central

OKLAHOMA
ARKANSAS
TEXAS
LOUISIANA

Major Equipment

Folding carton plants	27
Cutters & creasers	105
Letterpress printing presses	22
Offset printing presses	69
Offset: up to 3 colors	7
Offset: over 3 colors	14
Offset: up to 60″	16
Offset: over 60″	2
Dry offset or letterset	1
Flexographic printing presses	18
Gravure printing presses	5
Gluers, timed	36
Gluers, untimed	45
Waxers & waxing attachments	12
Laminators	1
Sheet cutters, guillotine	12
Sheeters, web fed	11
Corr. boxmaking equipment	3
Case sealers	14
Computers	5

Estimated Expenditures

Specialty papers	$2,498,496
Ink	4,897,620
Waxes & coatings	903,474
Corrugated containers	2,919,306
Die materials	1,236,066
Press plates, print supplies	5,224,128
Adhesives	1,213,758
Embossing foils	732,108
Tapes	171,366
Maintenance materials	3,425,292

Mountain

MONTANA
IDAHO
WYOMING
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO

Major Equipment

Folding carton plants	7
Cutters & creasers	40
Letterpress printing presses	8
Offset printing presses	44
Offset: up to 3 colors	11
Offset: over 3 colors	3
Offset: up to 60″	11
Offset: over 60″	0
Dry offset or letterset	0
Flexographic printing presses	0
Gravure printing presses	0
Gluers, timed	9
Gluers, untimed	12
Waxers & waxing attachments	2
Laminators	1
Sheet cutters, guillotine	12
Sheeters, web fed	7
Corr. boxmaking equipment	0
Case sealers	1
Computers	3

Estimated Expenditures

Specialty papers	$800,046
Ink	1,568,658
Waxes & coatings	0
Corrugated containers	934,908
Die materials	249,444
Press plates, print supplies	1,673,000
Adhesives	269,724
Embossing foils	234,234
Tapes	54,756
Maintenance materials	1,097,148

Pacific

ALASKA
WASHINGTON
OREGON
HAWAII
CALIFORNIA

Major Equipment

Folding carton plants	58
Cutters & creasers	246
Letterpress printing presses	56
Offset printing presses	254
Offset: up to 3 colors	41
Offset: over 3 colors	50
Offset: up to 60″	51
Offset: over 60″	22
Dry offset or letterset	11
Flexographic printing presses	32
Gravure printing presses	10
Gluers, timed	100
Gluers, untimed	121
Waxers & waxing attachments	50
Laminators	15
Sheet cutters, guillotine	65
Sheeters, web fed	34
Corr. boxmaking equipment	4
Case sealers	46
Computers	23

Estimated Expenditures

Specialty papers	$47,165,938
Ink	14,041,872
Waxes & coatings	3.106,896
Corrugated containers	8,371,584
Die materials	2,720,562
Press plates, print supplies	14,978,08
Adhesives	3,224,520
Embossing foils	2,097,966
Tapes	490,776
Maintenance materials	9,821,604

dietary selection. This control may call for the assured presence, or absence, of some specific factor in food. That need not entail a dull diet of some flabby gruel derivative. Trained dieticians can formulate extensive varieties of tasty, inviting foods that meet most of these individual needs.

It is expected by marketers and medicals that this potential will be sought and developed by foodmakers, much as the ancient alternates of vanilla/chocolate/strawberry in ice cream flavors were expanded into the present uncountable combinations, and as the original tomato soup became father to the famous "57 different varieties."

One more promising field for box

innovation is the "tamper-evident" (as distinct from unattainable tamper-*proof*) packaging. Sober, knowledgeable social experts believe that the need for this safeguard will grow, as our social pressures and divisive resentments grow, with our crowding population. It is seen that the need will not be limited to the likes of optional headache remedies, but will extend to our everyday foodstuffs and other necessities, exposed unguarded in retail outlets and in transport.

These are some of the now-visible areas for carton innovation, within the present capabilities of the basic paperboard box. To be noted, again, is that the daily consumption of just one additional folding carton by each of this country's people would call for the production of 65,000 added boxes per minute, every minute of every day. It remains to see the need, and sell the cartons.

Rigid Box Industry Is In Mature Phase

Survivers of this tightened market are innovative specialists who have learned to be more efficient.

Industry data and the opinions of plant owners who comprise the rigid paper box industry give statistical and verbal testimony to the fact that it is not growing. It is in the mature phase of its life cycle.

The rigid box has been in America since 1842. Growth in sales continued upward for 75 years, at which time folding cartons evolved as an alternate paperboard package. Both package forms continued growing until the 1950s along with the broad ever-expanding demand for packaging. Rigid box volume, however, expanded at a declining growth rate.

After 1950, the impact of other package forms on rigid box markets accelerated. Nevertheless, the industry dollar volume has continued to expand at the average rate of 4% yearly, while the number of producing plants declined from 850 in 1955 to 454 in 1967 to 318 in 1977, and as of 1983, there are fewer than 200 manufacturers who employ 20 or more workers. Three out of four "survivors" hold membership in the National Paperbox & Packaging Association, permitting us to obtain from 20 companies personal appraisal for the industry this year and for five years down the road.

End-Use Survey of Rigid Box Industry Sales

	(Percent)								
(Millions)	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**
Textiles Apparel & Hosiery	4.9	7.5	3.7	4.8	7.3	4.5	4.4	5.5	3.3
Dept. Stores & Specialty Shops	10.1	9.9	10.7	10.6	10.1	8.3	6.8	7.1	5.6
Cosmetics & Soaps	3.9	1.8	5.3	5.1	3.3	4.3	5.5	3.9	1.4
Confections	9.8	13.3	10.5	8.1	9.0	15.7	12.6	18.0	16.6
Stationery & Office Supplies	10.4	9.7	12.5	13.2	11.8	15.0	13.5	9.3	17.1
Jewelry & Silverware	8.6	5.2	4.2	14.0	10.7	7.6	9.3	9.7	10.0
Photographic Products & Supplies	3.2	2.2	2.4	2.7	3.0	3.5	4.5	4.3	4.5
Shoes & Leather	7.5	4.8	1.3	1.1	3.7	0.4	0.3	0.2	0.3
Drugs, Chemicals & Pharmaceuticals	7.8	6.9	9.3	7.3	4.9	13.1	7.5	7.8	6.3
Toys & Games	1.1	2.3	3.3	2.6	2.1	1.4	1.4	1.8	2.9
Hardware & Household Supplies	7.7	7.0	6.4	6.2	5.4	3.4	5.5	4.0	7.5
Food & Beverages	1.2	2.9	3.6	0.3	2.9	5.4	4.3	3.9	1.4
Sporting Goods	1.4	1.9	0.7	1.0	1.2	1.7	1.2	1.2	0.4
Other Major Customers (A)									
(a) Electronics	2.3	3.4	4.2	2.6	2.9	4.3	2.6	3.5	3.9
(b) Educational	4.8	3.9	3.9	6.5	5.2	3.8	3.7	4.4	2.7
(c) Other	10.5	12.2	12.2	7.1	10.7	1.1	8.4	7.0	7.8
Misc. Customers	4.8	5.1	12.4	6.8	5.8	6.5	7.5	8.4	8.3
	100%	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

To survive in the rigid box business, a manufacturer must manage his company aggressively, and concentrate on expanding his sales. Primarily, this is achieved by buying out other producers, diversifying, or both. Nearly half of America's RPB producers make other package forms besides rigid boxes—folding, formed plastics, corrugated, etc.

To survive in the rigid box business, a manufacturer must manage his company aggressively . . .

There is continuing growth in RPB industry dollar sales volume, from $259 million in 1967 to $528 million in 1983. While dollar sales almost doubled, however, the production volume dropped 35%. Thus, the production index of 100 in 1967 had fallen to 65 at the end of 1982 after allowance was made for inflation.

End-use markets for rigid boxes shift over the years, as can be seen from the table.

Textiles and department store boxes, which used to be predominantly rigid box markets, appear to represent declining shares of the total market. The largest end-uses are confections, stationery and office supplies, and jewelry or silverware.

Industry of niches

According to Leigh Stein, C.O.B., Design Pak, Inc.: "Our product has had perhaps the longest life cycle for any article manufactured in the U.S. Just when the industry is being demolished by segments of the economy moving to a different form of packaging, a new requirement for set-up boxes supports an otherwise dismal outlook. Ours has become an industry of niches. The quality of our rigid box is often sought after for a more expensive product, such as writing instruments, jewelry and miniature or smaller cameras, etc."

The following end-uses are seen by manufacturers as areas where RPB sales will increase and decrease.

End-uses which will increase:

- Confections, educational training kits, storage boxes, computer supply boxes.
- New products in electronic and entertainment fields.
- Top-line point-of-purchase products, executive mail order items, sales promotional items.

Rigid box quality and reusability continue to make it a preferred package.

- Quality packages and combination rigid with other package forms.
- Higher-priced department stores seeking to upgrade image. Confections in $17 to $25 range.
- Slip cases for computer software.

End-uses which will decrease:

- Department store and textiles.
- Expensive jewelry boxes and cosmetics.

On balance, rigid boxmakers are cautiously optimistic. As one boxmaker put it, "We survivors have learned to be more efficient. We are actually innovative specialists in packaging who sell quality rigid boxes, which will command a larger share of the packaging market."

Several manufacturers also believe modest growth over the next five years will come from making expensive packages for delivery over greater distances.

From the standpoint of individual companies who are projecting growth over the next five years, diversification, acquisitions and increased sales of allied products will be the driving force with rigid boxes making a positive, but proportionately smaller, contribution to overall company growth.

The consensus is that 1984 will show a 5% dollar increase in industry sales over 1983 and remain constant in units sold. Looking ahead to 1988, growth of 4-8% is expected for industry sales in constant dollars. As one industry expert put it, "If the economy is strong, we will be strong and expand."

Rigid box quality and reusability continue to make it a preferred package.

Converters Are Finally Starting To Sign Checks

Paperboard Packaging's first Equipment Purchasing Plans Survey focuses on specifics.

For the first time, *Paperboard Packaging* has conducted a survey of corrugated container and folding box plants throughout the country to find out exactly what they plan to spend on equipment this year and what they think about their machinery in general. The response rate for this survey—conducted in October by Infometrics National Research Center, Duluth, Minn., a service of Harcourt Brace Jovanovich Publications, Inc.—was very good: 16% for corrugated, 17% for folding carton. As opposed to stating here various percentages and possible conclusions that can be drawn from them, we'll let the accompanying eight tables do all the talking and let the reader draw

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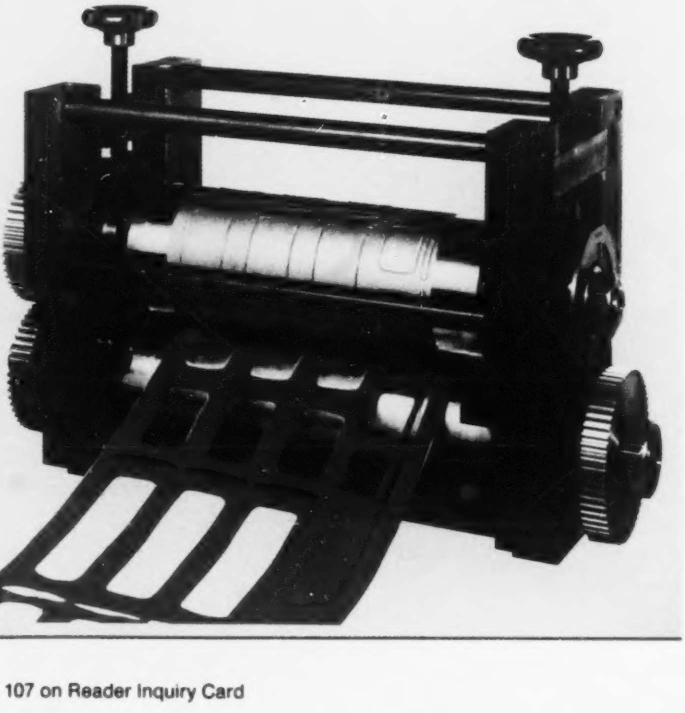

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Table 1 - Planned 1984 Machinery Expenditures

	Corrugating & Sheet Plants	Folding Carton Plants
Nothing	15%	43%
Up to $250,000	48	38
$250,000-$500,000	16	6
$500,000-$1 M	15	2
Over $1 M	7	6
Didn't Specify	-	4

Table 2 - 1984 Machinery Expenditure Plans Compared to 1983

	Corrugating & Sheet Plants	Folding Carton Plants
More than 1983	45%	38%
Same as 1983	18	26
Less than 1983	32	36
Didn't Specify	5	-

Table 3 - 1984 Plans to Purchase New Equipment

	Corrugating & Sheet Plants	Folding Carton Plants
Nothing	28%	47%
Up to $250,000	47	36
$250,000-$500,000	10	9
$500,000-$1 M	10	2
Over $1 M	5	6

Table 4 - 1984 Plans to Replace Existing Equipment

	Corrugating & Sheet Plants	Folding Carton Plants
Nothing	55%	54%
Up to $250,000	29	38
$250,000-$500,000	7	2
$500,000-$1 M	3	-
Over $1 M	5	6
Didn't Specify	2	-

his or her own conclusions. In sum, though, the overall picture is encouraging.

The most pleasant surprise of all was the number of corrugators sold in 1983. The definition of "corrugators sold" is ones that are brand-new (not retrofits) but not necessarily *installed* in plants yet. Ten of these were counted. The questions one must pose are whether this figure is the sole result of pent-up demand, and whether this many are going to be sold every year. After talking to a number of key executives on this matter, it can be concluded that three or four corrugators are going to be sold each year simply because the plant's current corrugator is too old to meet today's production demands. Although there is not a whole lot of expansion to begin with, one executive pointed out that this industry is "trying to catch up" in state-of-the-art technology, and, with funds "in the freezer" for the past few years, it was a matter of spending or dying a slow death. Will another 10 (or more) corrugators be sold this year? The chances are very good.

With regards to other machinery: based on our survey results, finishing equipment (flexo folder-gluers, folder-gluers, diecutters) has a very bright future.

Financing equipment

"We've seen a dramatic upturn in business since last summer," says an executive of a financing and leasing company. "As long as interest rates remain stable, the good news will continue. Right now we're in the middle of climbing a hill and the end is not in sight. A lot of plants are turning away from the plain brown box and concentrating on the value-added aspect. This means they'll be looking for equipment that will give that to them. People are buying."

Used-equipment dealers did well last year (up an average of 22% over 1982) and at least one is increasing its capacity "in preparation for the best year in the company's history."

Finally, an astute (but sadly true) observation was made by one industry veteran when he pointed out that there are "no new Wards." What did he mean?

"More and more of the corrugated container industry's suppliers of large

Table 5 - 1984 Plans to Improve Existing Equipment

	Corrugating & Sheet Plants	Folding Carton Plants
Nothing	39%	34%
Up to $250,000	42	64
$250,000-$500,000	8	4
$500,000-$1 M	3	-
Over $1 M	5	2
Didn't Specify	3	2

Table 6 - 1984 Corrugating and Sheet Plant Equipment Purchase Plans

Splicer	13%
Fingerless Single Facer	11
Printer-Slotter	16
Folder-Gluer	14
Flexo Folder-Gluer	23
Cutoff Knife	13
Downstacker	13
Rotary Diecutter	27
Flat-Bed Diecutter	13
Laminator	11
None	16
Didn't Specify	13

Table 7 - 1894 Folding Carton Plant Equipment Purchase Plans

Rotary Diecutter	2%
Flat-Bed Diecutter	6
Flexographic Press	4
Offset (Litho) Press	21
Gravure Press	2
Letterpress	4
Folder-Gluer	26
Laminator	4
None	54

(continued on page 52)

For more information on International Paper Box Machine Co., Circle No. 127 on Reader Inquiry Card

equipment are foreign manufacturers," he laments. "There are no new American manufacturers and some of the major companies have lost some capabilities. 1983 may have been the year American equipment fell behind European and Japanese equipment. I hate to say that but it could be true." He concluded that today the cost of starting up a new company is so astronomical that he "can't see the possibility of any new (American) companies entering the field." It is not the first time these sentiments have been expressed. Still, there is no doubt that in the paperboard converting industry today "buying American" and getting the best equipment can no longer *automatically* be taken for granted.

Table 8 - Significant Machinery Problems

(According to ALL respondents—corrugating, sheet plants, and folding carton plants)

	Major Problem	Somewhat of a Problem	Not Much of a Problem	No Problem	Didn't Specify
Insufficient Speed	15%	30%	31%	22%	1%
Lack of Flexibility & Versatility	8	28	34	29	1
Availability of Spare Parts	9	29	34	29	-
Energy/Power Consumption	5	29	32	32	2
Vendor Service	6	24	31	38	1
Cost	39	39	11	11	-
Quality of Construction	4	27	33	35	1

Canadian Outlook For 1984

Canadian Corrugated Market Recovers From '83 Strike

by Frank Rook
Executive Director
Canadian Corrugated Case Association

The Canadian economy is closely linked to the United States economy. During a business cycle, Canada seems to lag in both downturn and upturn. Demand for corrugated containers follows this pattern.

1982 was particularly disastrous for the industry. Not only was there declining demand, but 45% of eastern Canada's corrugated capacity was out of production for six months because of a strike. Not unexpectedly, consumers had to turn to the U.S. to augment supply from the idle Canadian plants. Even after the strike, consumers continued to import larger-than-normal volumes from U.S. suppliers. Imports into Canada, particularly into the eastern region, have been running 60% higher than the pre-strike norm. This reflects the advantages U.S. plants enjoy—lower paperboard costs and markedly lower wages.

1983 demand will likely end up 5-6% higher than in 1982, much of the increase filled by imports from the U.S.

Many Canadian forecasts are expecting an increase in 1984 GNP of 3.5%. This will result in a buoyant demand for containers.

Shipments will likely be up by another 5-6% in 1984, bringing them to a level slightly below 1981.

Supply should be no problem in 1984.

Costs continue to inch up, despite improved cost controls such as retrenchment and improved productivity. Paperboard remains the dominant cost factor, and increases in board costs are quickly reflected in container selling prices.

I look for an increase in container prices early in the third quarter of 1984.

In short, 1984 will be a good year, with adequate supply and marginally increased selling prices.

F. D'Arcy Quinn

For the first time in the January Buying Forecast, Paperboard Packaging is devoting a full section to the Canadian industry, including articles by prominent members of that field.

Corrugated Production Improvement Due to Rise

by F. D'Arcy Quinn
Vice President/General Manager
Packaging Business
CIP Inc.

The consumption for containerboard/corrugated containers in Eastern Canada in 1983 is difficult to determine. Most of the large end-users had to run down inventories built up during the latter part of 1982 to protect themselves from a strike that closed down 60% of corrugated container converting capacity during the second half of last year.

The demand for containers remained very weak until well into the second quarter of 1983, and it wasn't until the third quarter that most of the industry started to enjoy pre-strike volume. These factors make it hard to determine the change in year-over-year demand for containerboard/corrugated containers. However, we estimate that the Eastern Canadian market improved by some 2.5%, to 934,000 tons last year.

The overall improvement experienced in the Canadian economy, especially during the second half, is expected to continue through 1984. We estimate that real GNP in Canada will grow by 5% this year. This should result in a 4% increase of containerboard/corrugated containers with the total demand for Eastern Canada estimated at 971,000 tons. Increased demand is expected to occur in almost all major end-use markets, especially furniture, white goods and brewery segments (as some breweries move away from re-trippers to single trip containers). Because of poor crops in tomatoes, corn and peas last year, most canners should have minimum carry-overs, which should result in greater corrugated demand, 1984 crops permitting. There are strong indications that containers produced from preprinted linerboard will begin to penetrate the Canadian market in 1984. While some segments of the brewing industry have begun to use preprinted containers with superior graphic presentation to create a stronger image for certain brands, the demand for this type of corrugated will be expanded into other markets such as small appliances, giftwares, and toys.

The Canadian corrugated industry continues to experience consolidation within its ranks through acquisitions and/or mergers. Several plant closures have already been announced with others likely to follow as companies rationalize their converting facilities in an effort to become profitable. This is a result of container manufacturers suffering a cost-price squeeze. Higher costs of raw materials, labor, finishing materials, freight, etc., have more than offset the revenue derived from price increases of corrugated containers. While improvement in productivity will help reduce some of this shortfall, further price adjustments will be required if the industry is to remain viable.

Total Canada

Major Equipment

Corrugating plants	55
Sheet plants	13
Corrugators	63
Independent single facers	6
Letterpress printer-slotters	118
Flexo printer-slotters	42
Flexo folder-gluers	115
Folder-gluers	38
Infold gluers	14
Tapers & folder tapers	125
Stitchers & folder stitchers	94
Diecutters, platen jaw	21
Diecutters, flat bed reciprocating	39
Diecutter stations, rotary	53
Wax impregnators, corr. coaters	60
Curtain coaters	21
Laminators	13
Unitizers & load strappers	57
Bundle tyers	119
Computers	21

Moderate Recovery Will Continue In Folding Cartons

by Robert F. Krause
President
Somerville Belkin Industries Ltd.

The Canadian economy is experiencing a moderate recovery, which will probably continue. No sharp upward curve in the pace of this upswing, however, is expected. The strength of the recovery in Canada is not as pronounced as what we perceive is taking place in the U.S.

The recession caused high unemployment, permanent idling of many plants and drastic reductions in business profits in Canada. The base from which Canada must move is weaker than that of the U.S. but is still solid. In the Canadian folding carton industry, we look for minimal growth in 1984 vis-a-vis 1983. A 1½-2% growth in real terms would be maximum.

1983 presented a year in which volume levels were rather strong in spite of minimum inventory positions being maintained at the customer level. The profit squeeze continued in 1983 because of overcapacity in the industry and market resistance to the pass-through of cost increases. This condition will no doubt prevail in 1984 as well.

Recent labor negotiations have produced more reasonable contract settlements, and the restoration of more normal inventory levels will provide a production boost. This provides a basis for cautious optimism.

New products in paperboard that replace non-paperboard packaging applications are aseptic packaging for juices and ovenable board for food products once presented in aluminum foil trays. Aseptic packaging for juices should proliferate rapidly in the individual 200- and 250-ml size packages.

The ongoing demand for convenience packaging encourages the introduction of folding cartons manufactured from ovenable board. Cartons made from this material and then filled with various food combinations have the unique ability to be reheated in conventional or microwave ovens. There is an extensive potential for this process in central commissary feeding establishments such as hospitals and schools.

On a pessimistic note, the tobacco industry will no longer enjoy above-average annual growth. The health hazard scare and excessive government taxation have combined to not only inhibit usage but to actually reduce the consumption of cigarettes in real terms. Expectations are for the decline to continue.

In summary, 1984 will resemble 1983 in many ways with little significant growth, a continuation of the overcapacity condition and the cost/price squeeze adversely affecting profits but, we hope, presenting enough opportunities that the industry will emerge in a stronger position at the end of 1984.

Canadian Folding Carton Markets Follow U.S. Trends

by Marcel J. Pilon
Vice President
Packaging Division
Lawson & Jones Ltd.

Many articles have been written on depressed folding carton markets in general. The Canadian market follows very closely the trends taking place in the United States.

The demand for folding cartons is highly correlated to consumer spending on non-durable items, which in 1983 was much improved over 1982. The Canadian GNP indicates a healthy recovery over the past nine months and, similarly, the carton industry follows with real growth of about 5% over 1982—a figure we get after using the boxboard price index as a price deflator.

Single-portion packs have not made a major penetration of the food markets . . .

According to a Business Trends Analysts report on the U.S. paperboard box market, the real growth for folding cartons over the next decade is expected to be 1.5%, and, as mentioned earlier, Canada is expected to follow a similar evolution.

The folding carton converter must monitor very closely the market segments he best serves in order to predict his eventual growth. A great number of changes is taking place. Aseptic packaging, which was slow in making its presence felt in the marketplace, is now suddenly being heavily promoted by a great number of juice and wine companies. The more luxury-oriented products (confectionery and cosmetics) are only now recovering from recessionary losses. Fast foods retain strong potential despite a major slowdown. Tobacco and distillery products continue to show declines due to increasing tax legislation intended to reduce health hazards.

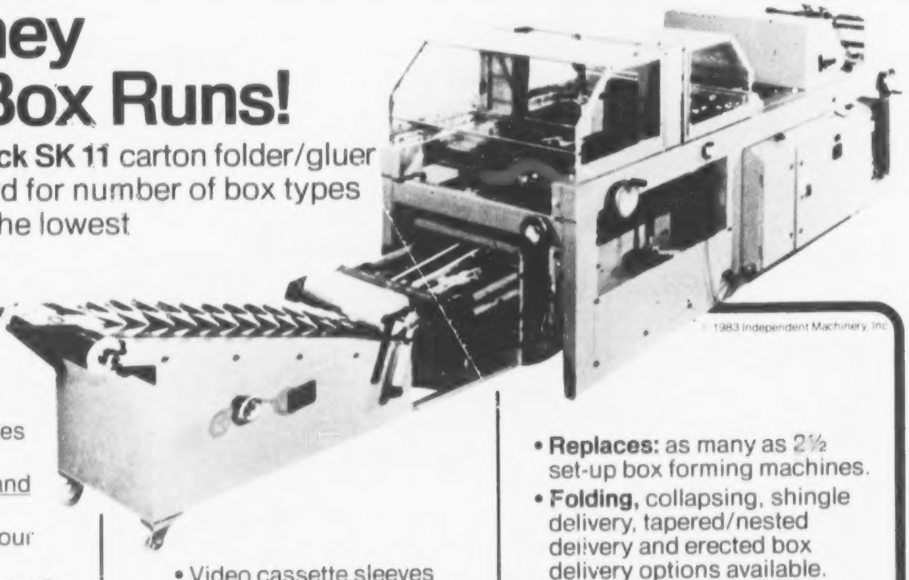
Although the number of single-person households is climbing, Canadians are still generally oriented towards large-family and economical sizes. Single-portion packs have not made a major penetration of the food markets, as can be seen in Japan and Europe.

Overall, the Canadian folding carton market continues to be operating with overcapacity. The resulting low margins make it very difficult for any converter to make any appreciable gain in market share without further reducing returns to a level which will make it impossible to upgrade or replace equipment. As in the United States, further consolidation of the industry is expected, and greater market segmentation will be required for converters to survive in a more price-sensitive packaging market that is shrinking over the long term. The folding carton converter will have to become more innovative and more aware of the emerging packaging needs of the end-user in order to compete against other potential packaging vehicles.

Canadian Folding Cartons Climb Slowly From Recessionary Valley

C. Kenneth Clements
President and General Manager
Telfer Packaing Ltd.

The folding carton industry in Canada had total sales in 1982 of $578 million, covering all folding, set-up and milk containers as well as goods imported from the U.S. This was a 5.5% increase from the previous year, but with a negative real growth factor. 1983 looks a little



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more promising, and the industry should finish with sales of $638 million (1% real growth and 10.4% total sales increase).

If current sales develop, as well as cost and market trends, 1984 should see a 12% increase. Unfortunately, the real growth factor will probably remain at about 1%.

The number of folding carton and set-up manufacturers in Canada has remained consistent at about 110, the majority located in Ontario. Of these, eight companies dominate the industry and compete for an ever-diminishing piece of the pie. With after-tax return on sales averaging about 3% and some operations losing money, the Canadian folding carton industry must expand its horizon. This expansion should come in two forms.

The first involves innovation. In past years, we have seen wine, milk and non-carbonated beverages in folding cartons. Our industry must now look at a broad packaging market to achieve prospective volume. We must leave our narrow mold and broaden our base. Research and development has been neglected here for many years, and we visualize considerable expenditures in this area to help us keep pace.

Major Equipment

Folding carton plants	87
Cutters & creasers	370
Letterpress printing presses	155
Offset printing presses	375
Offset: up to 3 colors	71
Offset: over 3 colors	55
Offset: up to 60"	86
Offset: over 60"	14
Dry offset or letterset	5
Flexographic printing presses	25
Gravure printing presses	14
Gluers, timed	90
Gluers, untimed	116
Waxers & waxing attachments	45
Laminators	9
Sheet cutters, guillotine	78
Sheeters, web fed	13
Corr. boxmaking equipment	3
Case sealers	19
Computers	16

The second growth area will come in the form of exports to the United States. This huge market has, for some unknown reason, been virtually ignored by Canadian converters. It is now seen by many of us here in Canada as a route to new volume, fuller utilization of our production overcapacity, and marketing of our considerable expertise and quality in a receptive U.S. market. Add to this duty remissions on board and favorable exchange rates, and our warning is: "Let the American converters beware."

The Canadian economy is lagging behind the U.S., and although things are marginally better now, we are still in a recessionary phase. In our opinion, it will be late 1984 before the picture brightens.

In order to not merely survive but to grow, the folding carton industry in Canada must improve its technology. Capital expansion has been virtually nil during the recession, and we are the worse for this fact in Canada. We must avail ourselves of the latest gravure technology, high-speed computerized offset equipment, platen diecutters and blankets, computerized gluers and automatic case packers. We have the people and the know-how, and we are investing in our facilities. When we emerge from this valley, the sky is the limit. ☐

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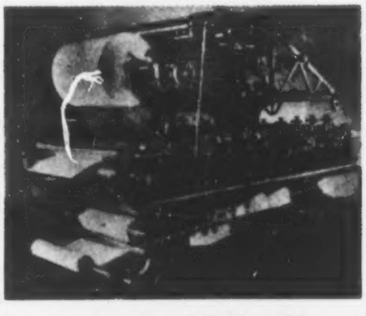

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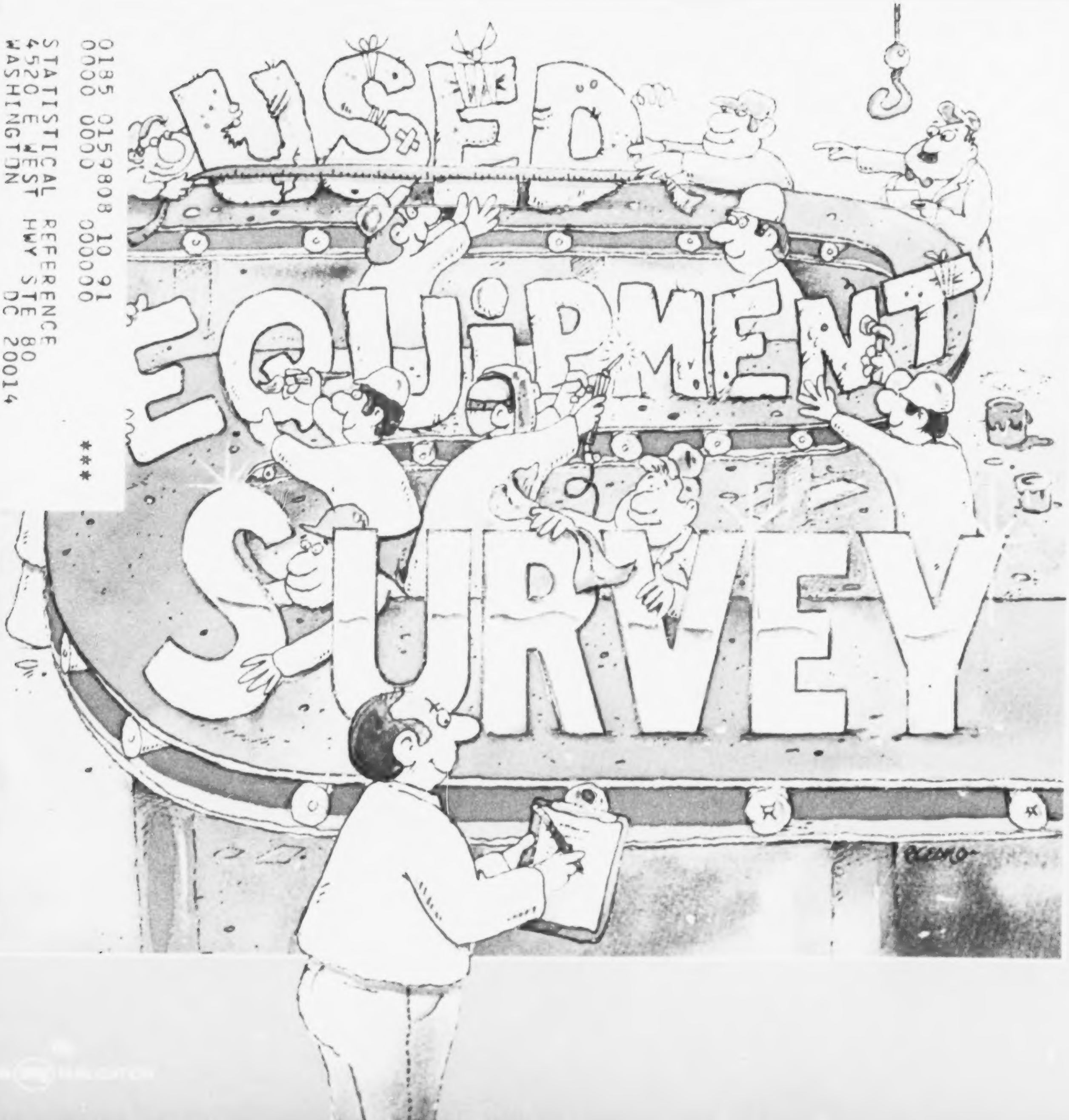
USED
EQUIPMENT
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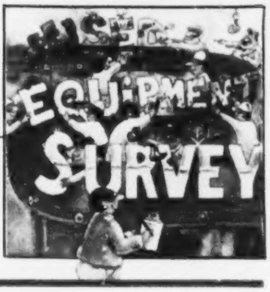
FEBRUARY 1984 VOLUME 69, NO. 2

On the Cover:

What do box plant owners look for when new machinery is prohibitive but operations need updating? See the Used Equipment Survey (begins on page 34). Cover illustration by Forrest Plesko.



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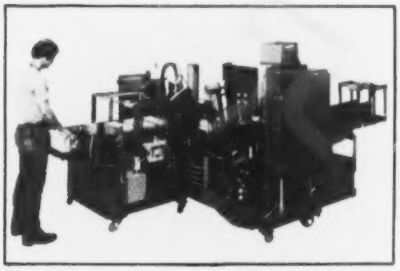
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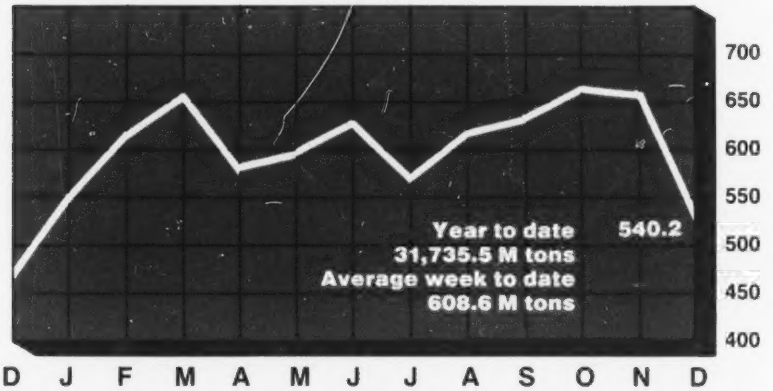
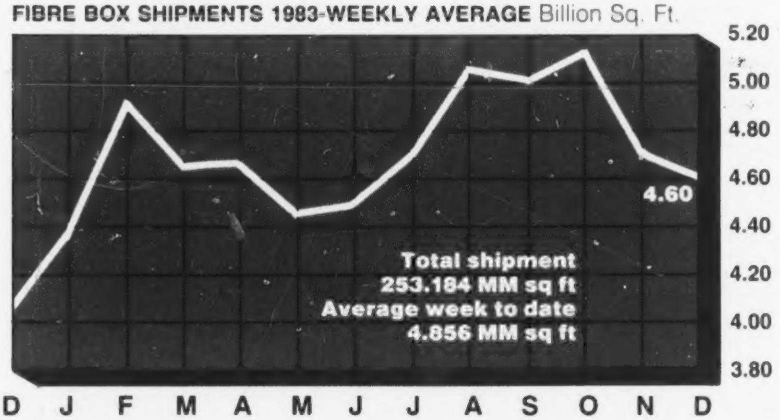
PAPERBOARD PRODUCTION 1983-WEEKLY AVERAGE 1,000 Tons



PAPERBOARD MILL OPERATIONS:

Initial data for 1983 indicate an approximate 31.7 million short tons of total paperboard production, up 9% from recessive 1982, and nominally above the previous all-time record high total of 31.5 million in 1979. This result, not only unpredicted but unexpected even as one watched it develop, concluded with a fourth quarter volume more than 10% higher than all previous records for that period. This upsurge in business is also reflected in production of corrugated containers, which also set a new annual record for shipped footage.

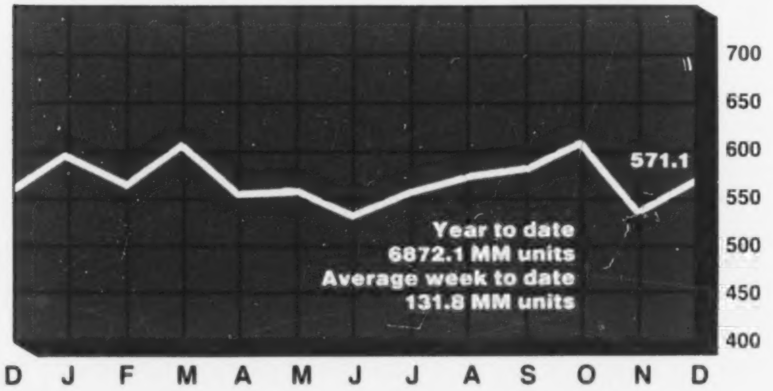
FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



PAPERBOARD-TYPE PRODUCTION:

U.S. output in 1983 included 74% of containerboards, about six percentage points over traditional average. The disparity is due to some, if faded, export demand plus the decline of boxboard packagings under invasion from alternate materials. It is seen that boxboard gains during cyclical upturns in business no longer fully recover their losses during recession. One victim of this evolution is the area of fiber reclamation for recycling. In spite of all campaigns, no upturn is visible in the waste paper area; total tonnage is down from earlier years.

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



RIGID PAPER BOXES:

Set-up box billings ended 1983 nearly 10% above '82, which had been more than 6% below '81 for the first annual decline since that 10% drop in depressed 1975 from '74—following a half-decade of increases averaging 7½% per year. At 1983-end, all of the NP&PA's regional areas were ahead of the previous year's billings, compared with only two at 1982-end—and some of those deficits were well into double digits. Further, the margins of increase widened in the more-recent months, suggesting that this rigid-box upturn is fully parallel with that of other board packagings.

paperboard packaging

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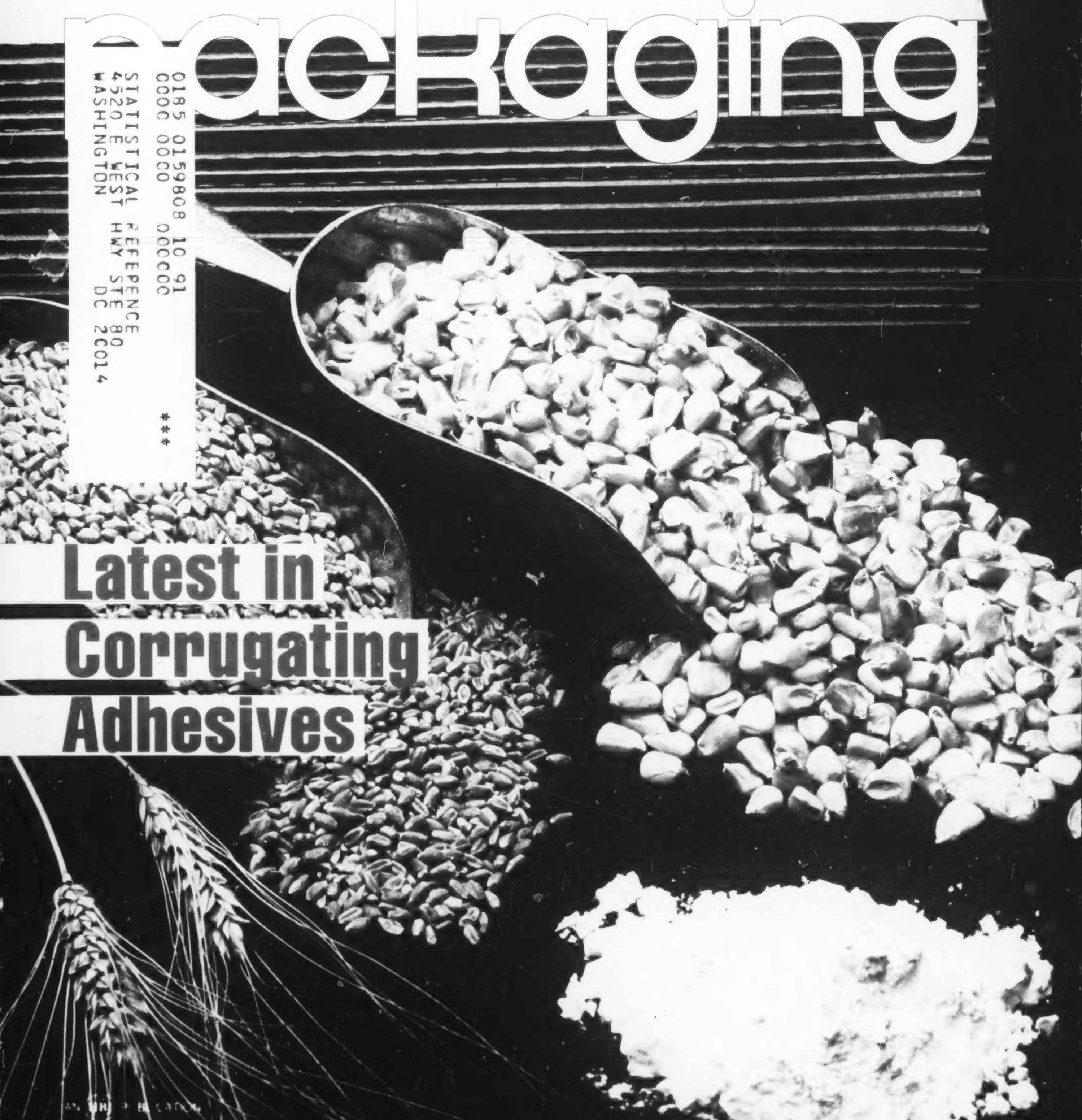

Latest in Corrugating Adhesives

AN HBJ PUBLICATION

paper board packaging

MARCH 1984 VOLUME 69, NO. 3

On the Cover:

Corn and wheat are the main raw sources of corrugating starch adhesives, a field of warring technologies that presents a rather, ahem, sticky subject. Starts on page 20. (Photo by Jeff Frey.)

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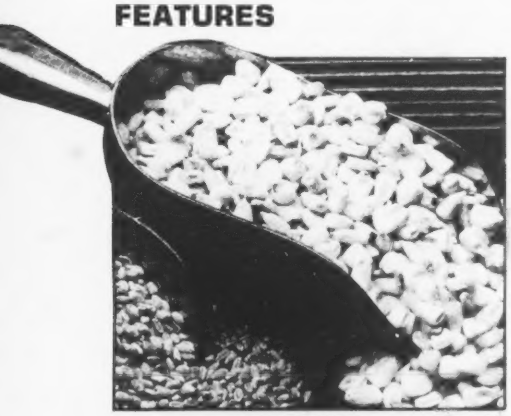

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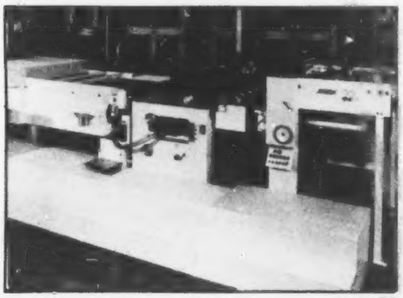

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ADHESIVES & STARCHES

20 **Corrugating Adhesives: Conflict in the Kitchen**
By Robert Gitlin
Increased corrugator speeds and the need for better shear resistance have spurred starch makers to come up with new formulations.

STATE OF THE INDUSTRY

30 **UV Drying Is Cure for Inks, Coatings, Varnishes**
Ultraviolet curing systems usually promise 200- and 300-watt capacities and the ability to produce high-quality graphics that rival lamination.

RULES & REGULATIONS

34 **Rule 41 Revision: Post-Mortem**
By George Maltenfort
Revising the present rules may be a good idea, but the latest effort failed for some very good reasons.

INTERNATIONAL REPORT

46 **The Future of the European Carton Industry**
By James J. Clancy
Firms planning to remain in this ebbing market after the turnaround had better have good reasons.

MEETINGS & CONVENTIONS

52 **FEFCO Congress in Ski Setting**
The major organization of European boxmakers will convene in Davos, Switzerland, this year.

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PAPERBOARD PACKAGING (ISSN 0031-1227) is published monthly by Magazines For Industry, Inc., a subsidiary of Harcourt Brace Jovanovich Publications. Corporate and Editorial offices: 7500 Old Oak Boulevard, Cleveland, Ohio 44130. Advertising Offices: 747 Third Avenue, New York, New York 10017 and 1 1 East Wacker Drive, Chicago, Illinois 60601. Accounting, Advertising Production and Circulation offices: 1 East First Street, Duluth, Minnesota 55802. Subscription rates: $18 per year in the United States; $25 per year in Canada. All other countries: $35 per year. Single copies (pre-paid only): $2 in the U.S.; elsewhere $4.50; add $3.00 for shipping and handling per order. Second class postage paid at Duluth, Minnesota 55806. Copyright © 1984 by Magazines For Industry, Inc., a subsidiary of Harcourt Brace Jovanovich, Inc. All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher. Microfilm copies of articles are available through University Microfilm, International, 300 N. Zeeb Road, Ann Arbor, Michigan 48106.

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OPEN HOUSE

54f **Open House Guests View Top-Line Gravure Press**
A Swiss manufacturer with more than 800 installations around the world recently unveiled its latest innovation.*

EQUIPMENT IN USE

60 **Friendly Rivals Reap Records and Rhymes**
By Loren Ashwood
Plant productivity prospers from employee enthusiasm.

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April: Managing a Corrugated Box Plant/Flexography

May: AICC Hall of Fame Winner/PPC, NP&PA Awards

June: Midyear Review/Ovenable Paperboard Update

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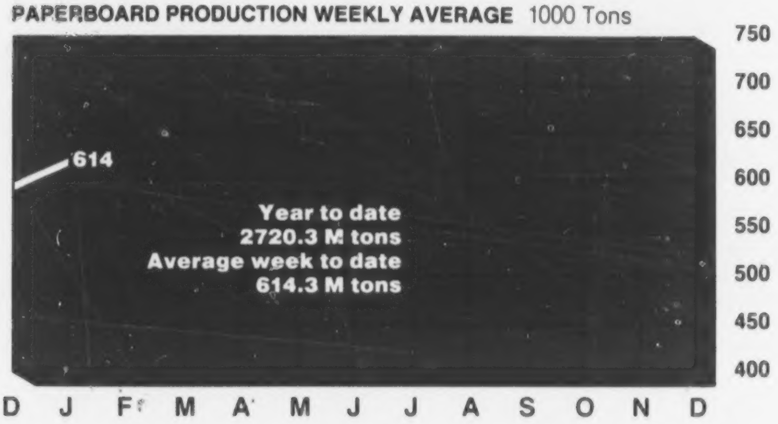
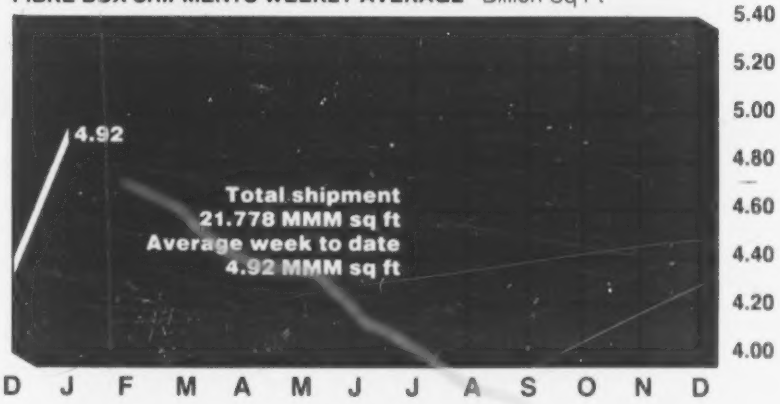


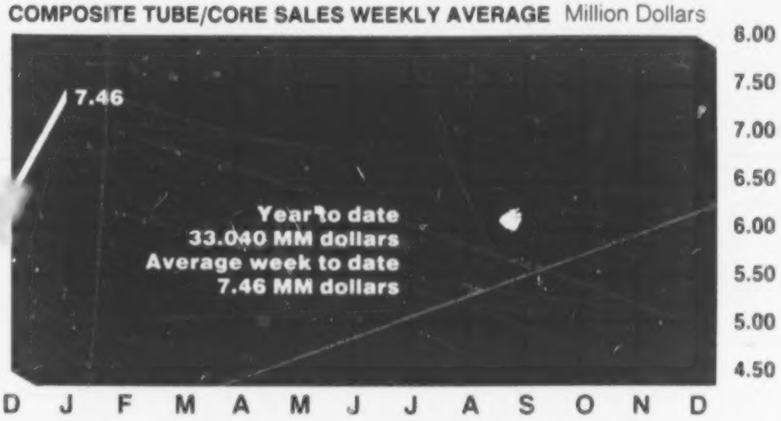
PAPERBOARD MILL OPERATION:
The first month of 1984 continued to reflect the increasing upturn that began last mid-year. A volume of 2720.3 M short tons in January was up 12% from the 1983 month, which had been 7.5% up from recessed '82, which was down 8% from the previous year. Recent business vigor, together with below-normal customer inventories, led to a reduction in the usual Holiday mill shutdowns, and thus produced the highest January tonnage in history. Also reflected are strong export demand and fibre box shipments, which have been setting highest-month records in the recent past.

FIBRE BOX SHIPMENTS WEEKLY AVERAGE Billion Sq Ft



PAPERBOARD-TYPE PRODUCTION
January's output included 2007.7 M tons of containerboards and 712.6 M of boxboards, up 12% from the 1982 month, as projected on historic basis from the American Paper Institute's "production by furnish" tonnages. The advance in boxboard volume includes a rise of 12.9% for recycled grades and of 10.1% for bleached boards. The trend evidently continues toward minimizing carton costs, since the price differential of solid bleached boards over clay-coated grades is currently more than one-third, an all-time high, and this margin can hardly be ignored in a competitive business.

COMPOSITE TUBE/CORE SALES WEEKLY AVERAGE Million Dollars



RIGID PAPER BOXES
Set-up box billings, up about 10% from the levels of early 1983, reflect an increase in unit price, rather than in volume. The tonnage of rigid boxes, which is not reported by the National Paperbox & Packaging Association, in general parallels that entering into folding carton conversion, which has had minimal expansion. This, again, is attributed to competition from alternate packagings in high-volume applications, and to components of other materials inserted in paper boxes, as well as to a slow response of some consumer areas to the upturn in business climate.

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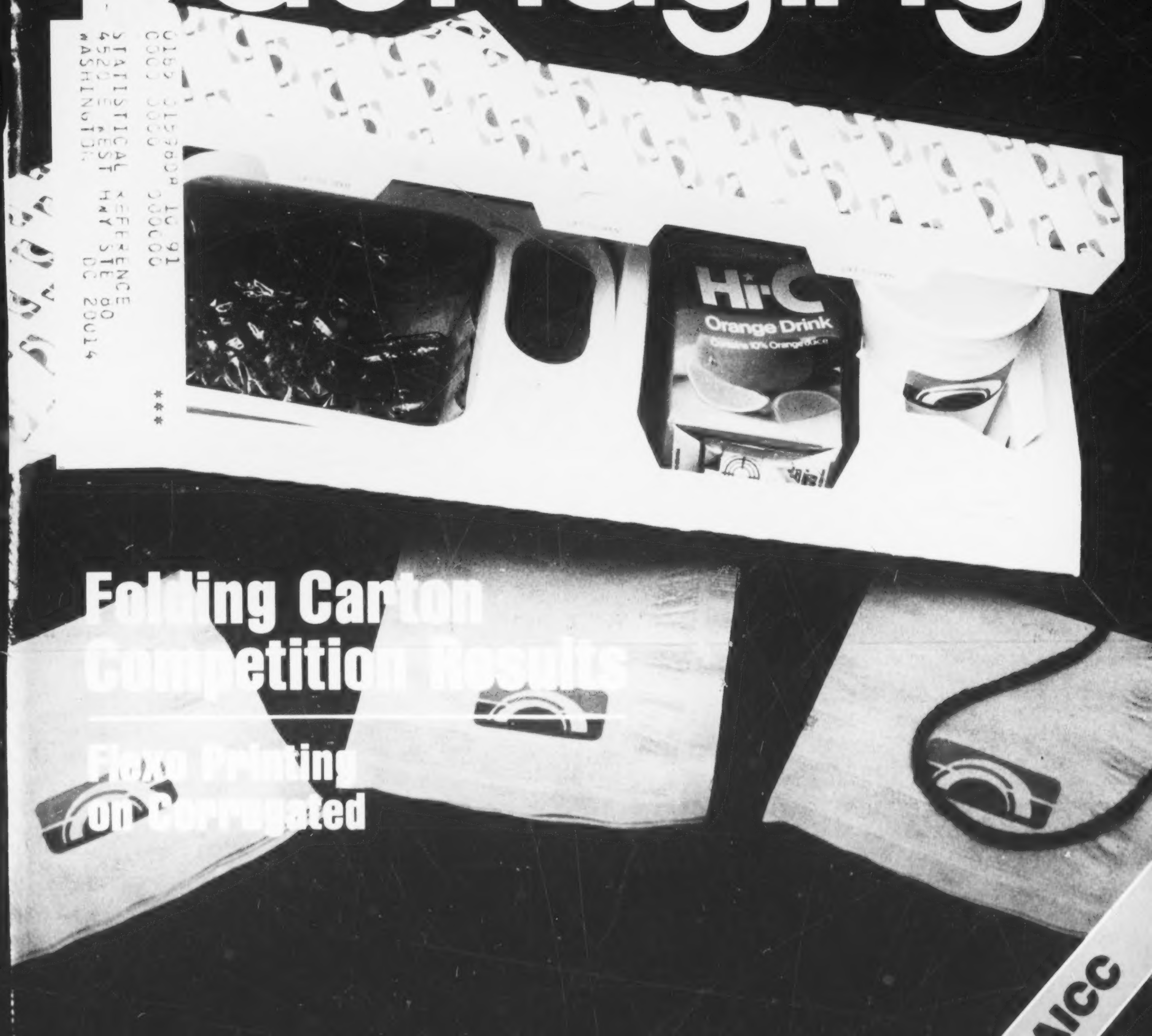
paper board packaging



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Folding Carton Competition Results

Flexo Printing on Corrugated

Hi-C
Orange Drink
Contains 10% Orange Juice

AICC

paper
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packaging

APRIL 1984 VOLUME 69, NO. 4

On the Cover:

This colorful portable airline meal tray won the top prize in the folding carton industry, the President's Award in the Paperboard Packaging Council's annual competition. Roundup starts on page 18.

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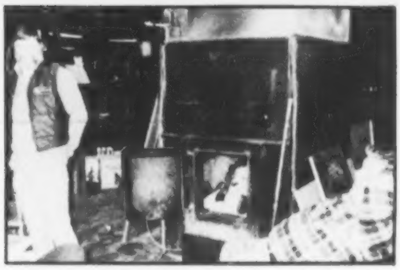

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HONORS & AWARDS

18 **Airline Meal Tray Wins Top PPC Prize**

Champion International won a prestigious packaging award with a compartmentalized portable food tray that represents a great convenience on small flights without attendants.

COMPUTERS

26 **The Ups and Downs of Going On-Line**

Paperboard Packaging queried corrugated box plant officials and was able to solicit frank personal reports on how the computerization trend has affected them.

PRINTING & GRAPHICS

30 **Flexography and Related Diecutting for Corrugated**

by Joseph Fuchs

New technology in board feeding and color registration has made direct flexo printing on corrugated board more responsive to point-of-purchase industry demands.

INTERNATIONAL REPORT

36 **Machinery Rejuvenation and Railroad Give Allard Special Allure**

by Mark Arzoumanian

Box plant is located in city that has played a special role in history.

INTERNATIONAL REPORT

42 **Working Together on Both Sides of the Atlantic**

A skilled, flexible work force makes an Irish plant one of the most valuable investments of a Brooklyn-based manufacturer.

EQUIPMENT IN USE

46 **"Bargain" Conveyor Suits Plant Style**

by Robert Gitlin

Allied Container Corp., Wilmington, Del., can handle its high volume of diecut finished goods cheaper and easier with an automatic counting/accumulating offbearing machine.

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PROFIT IMPROVEMENT

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by Mark Arzoumanian
The AICC's Realworld Selling Course, as witnessed at Select Corrugating Services, succeeds through a policy of "give-and-take" and role playing.

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58 **Deducting Bad Debts—Before They Happen**
by Robert Feinschreiber
The reserve method for bad debts is a vital technique for all companies with receivables.

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July: Corrugator Technology/Paper Recycling Systems

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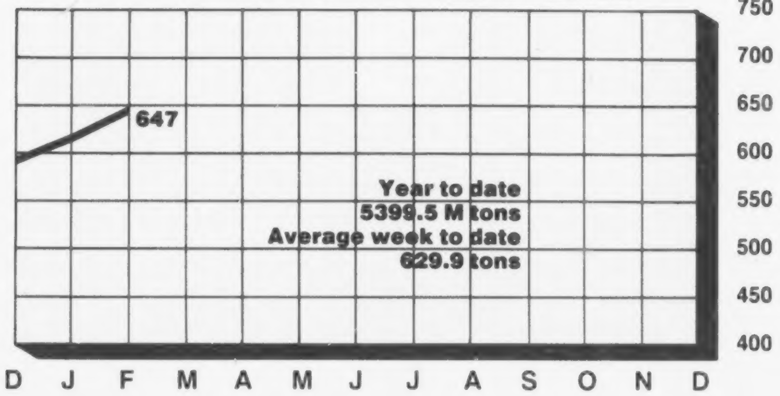
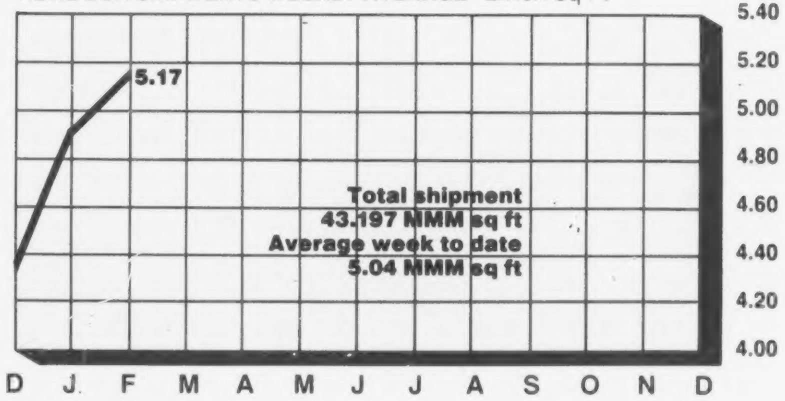


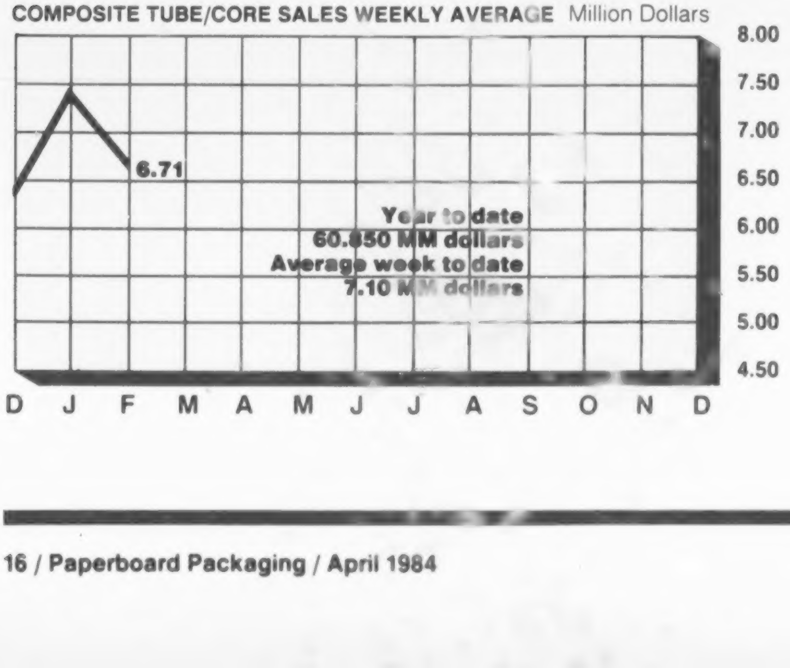
PAPERBOARD MILL OPERATIONS:
Through two months of 1984, paperboard production was up 9% from '83, with the margin continuing to widen as it had in the closing months of last year. February's average-week tonnage was up 9.6% from '83, which had been 4.6% down from '82, which was up 1.3% from '81, which had been 5.6% down from '80—illustrating the wide gyrations of demand and supply under the economic swerves in recent years. Gratefully, this year has been one of upturn, and of record-setting production.

FIBRE BOX SHIPMENTS WEEKLY AVERAGE Billion Sq Ft



PAPERBOARD-TYPE PRODUCTION:
In February, a projected 2679.2 M tons of board included 1989.2 M of containerboards and 695.0 M of boxboards—up respectively 10.6% and 8.7% from '83. The long-term trend for some packagings is seen, unfortunately, in this volume to date, relative to 10 years ago, with containerboard tonnage 29% up from same-time 1974, but with boxboards only 2% higher, in the face of a U.S. population rise of 11% during that decade, to around 235.2 million people, entering 1984.

COMPOSITE TUBE/CORE SALES WEEKLY AVERAGE Million Dollars



RIGID PAPER BOXES:
Set-up box billings (total reported sales) in early 1984 are up some 9% from '83, and by 56% in the years since 1974, as reported by major producers to their NP&PA. This can only suggest a distinct decline in recent-years tonnage, since in the parallel case of folding cartons the ton-price has gone up an average of some 9% annually. That again seems to substantiate the decline, now decades-long, in output of boxboards, with geography having its usual strong influence on the vigor of local business.

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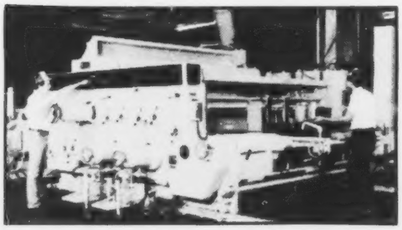
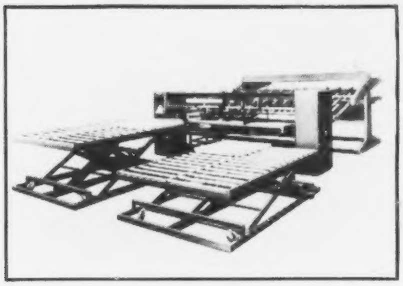
MAY 1984 VOLUME 69, NO. 5

On the Cover:

Liking Weyerhaeuser's high-end program are Bruce White, Color-Pak product manager; Bob Coon, Heileman Brewing; Bob Barnes, box plant general manager; Roger Miller, sales manager. See page 18.

FEATURES





OPERATIONS MANAGEMENT

18 **Color-Pak Succeeds Through Worker Pride**
A St. Louis integrated box plant has completely overhauled its approach to high-quality graphics sales.

HONORS & AWARDS

24 **Van Horne Sr. Inducted into Hall of Fame**
A prestigious packaging-industry award was presented posthumously at last month's AICC meeting in Miami.

PROFIT IMPROVEMENT

26 **Consistent Pricing Policy Saves Time, Headaches**
by Harry Watton III
A coordinated price policy allows salesmen to work faster and sell more.

INTERNATIONAL REPORT

36 **Box Firm Enjoys Cozy Relationship with Customers**
New corrugator, stitchers, baling equipment and computers have all played a part in the technological overhaul that has strengthened a British firm's position in the U.K. market.

PRINTING & GRAPHICS

42 **Back to Basics: Print Job Case Study**
by James J. Owens
After a few unsuccessful runs, a corrugating box plant took a hard look at its printing procedure and plates, and got good printing with existing equipment and labor.

EQUIPMENT UPDATING

46 **Feed Table Retrofit Speeds Up Diecutter**
by Robert Gitlin
A Pennsylvania box plant has strengthened its reputation as an operation with a modest brace of converting machines but a formidable capacity for large-scale production.

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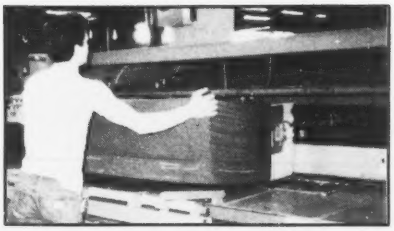

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48 **API Paper Week Brings Converters Glad Tidings**
by Mark Arzoumanian
Containerboard production for domestic use established new highs last year, and current rates are even higher.

EQUIPMENT IN USE

50 **Cold Glue Option Cuts Cost Overruns**
Converting tapers to a new capability has solved the problem of box returns from tape bond failure.

MEETINGS & CONVENTIONS

52c **FEFCO's 18th Annual Congress Is Success in Switzerland**
A good time was had by all 1026 attendees March 26-30 in Davos, as these photos show.*

OPEN HOUSE

52f **"Corrugated 84" Displays Bobst Technology**
Many travelers to FEFCO also took a tour of two facilities in the Lausanne area to see demonstrations of new machinery.*

*International Edition

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August: Operator Training/Preprinted Linerboard

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INDUSTRY STATISTICS FOR 1984

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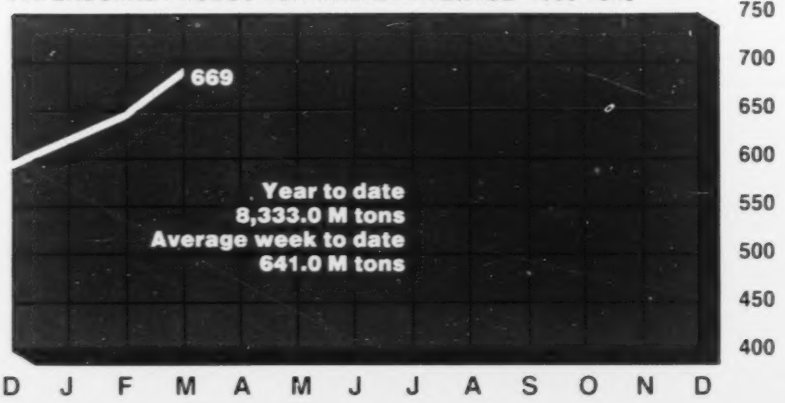
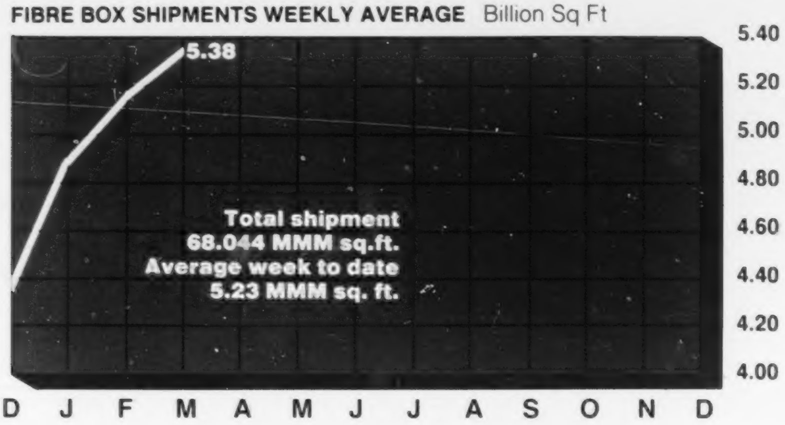


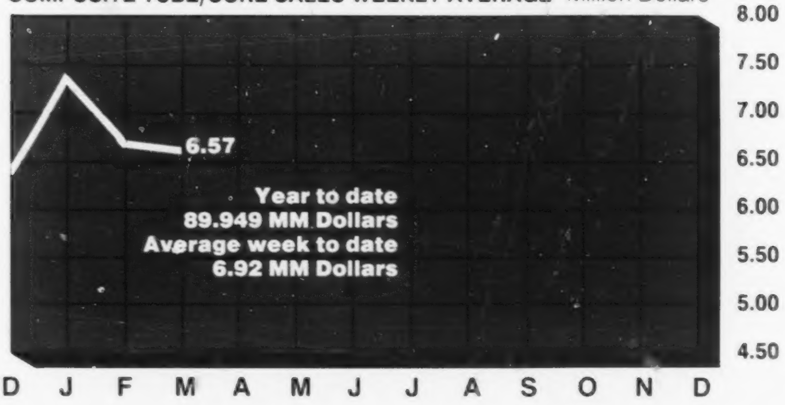
PAPERBOARD MILL OPERATIONS: At first-quarter end, 1984's average weekly output was 9.8% above the same-period 1983 tonnage, which had been 3.5% above '82, compared with a drop of 4.7% in '82 from '80. In March, 2962.2 M tons of production was 2.4% ahead of last year, which had been 3.5% up from the '82 month. It is to be noted that containerboard grades currently comprise some 74% of total tonnage, compared with about 66% a decade ago. This would delineate the slow but steady decline in folding carton and rigid paper box production, against competition.

FIBRE BOX SHIPMENTS WEEKLY AVERAGE Billion Sq Ft



PAPERBOARD-TYPE PRODUCTION: In March, the total tonnage of board output included 2189.3 M of containerboards, up 6.4% from 1982 and by 23% in the decade, plus 772.9 M tons of boxboard grades, 11.2% up from the depressed 1983 month, but 15% below the volume of 1973. These reversals probably reflect a permanent evolution in the solid-board packagings. The converted products of boxboard grades are under successful attack by alternates, with "no place else to go." But our containerboards are the least costly anywhere in the world, and thus the demand is sustained.

COMPOSITE TUBE/CORE SALES WEEKLY AVERAGE Million Dollars



RIGID PAPER BOXES: Through the first 1984 quarter, set-up box business continued to show good response to the general upturn, some 12% above 1983 billings. The geographical variations remain at an extreme, however, ranging from high double-digit improvements in the South and Midwest to comparable declines in the East—the traditional "see-saw" effect from the year previous. This again illustrates the vulnerability of boxboard packaging products to economy gyrations and to competition from alternate materials—and the latter has not disappeared with the upturn.

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Ovenable Paperboard Update

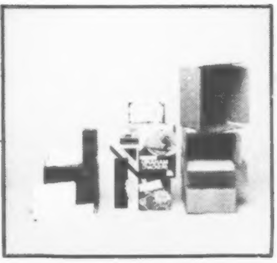
No Preservatives. No Artificial Flavors. No Kidding!
macaroni products
thin spaghetti
GRAHAM CRACKERS
NET WT 16 OZ (ONE POUND)
3 stay fresh PACKS
4 Keep Fresh Reclosable Bags
Saltine Crackers
vegetables & sauce mix for Sukiyaki
SAVE 35¢
JUST ADD BEEF

AN HBJ PUBLICATION

paper
board
packaging

JUNE 1984 VOLUME 69 NO. 6

On the Cover:



The Midyear Review (see page 18) shows revived markets in all areas of paperboard packaging, a change for the better that should continue until the end of the year.

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Tuna Fish Casserole
Chicken Chow Mein
Broccoli Hollandaise
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Key industry representatives assess the past six months and look ahead to what the future might bring.

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by Robert Gitlin

It's not the boom that was forecast by an excited mid-'70s industry, but dual-oven trays are enjoying modest, steady growth in this post-recession climate.

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30 **FTA Awards Competition Sets Many New Records**

More entries were received from more companies and more nations than ever before.

RULES & REGULATIONS

34 **Does Your Financial Statement Convey the Right Impression?**

by Morton S. Ackerman

An airtight year-end report influences bankers and creditors the way a good box impresses customers, creating a high regard that carries over to respect for the company in general.

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38 **Italian Firm Weathers Change with Aplomb**

Gandossi & Fossati's decision to close one of its four plants and modernize has generated undue concern about its future production capabilities.

OPERATIONS MANAGEMENT

42 **Small-Computer Wizardry Ups Plant Productivity**

According to a pleased Illinois box plant owner, it took someone with experience in the corrugated field to come up with a user-friendly computer system that really worked.

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PAPERBOARD PACKAGING (ISSN 0031-1227) is published monthly by Magazines For Industry, Inc., a subsidiary of Harcourt Brace Jovanovich Publications. Corporate and Editorial offices: 7500 Old Oak Boulevard, Cleveland, Ohio 44130. Advertising offices: 747 Third Avenue, New York, New York 10017 and 111 East Wacker Drive, Chicago, Illinois 60601. Accounting, Advertising Production and Circulation offices: 1 East First Street, Duluth, Minnesota 55802. Subscription rates: $18 per year in the United States; $25 per year in Canada. All other countries: $35 per year. Single copies (pre-paid only): $2 in the U.S.; elsewhere $4.50; add $3.00 for shipping and handling per order. Second class postage paid at Duluth, Minnesota 55806.
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This year's NP&PA Packaging Competition boasted a 20% increase in entries over 1983 and rising participation by folding carton industry members.

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51 **The Paper Industry and the Economy**
by Norma Pace
Will 1985 see the beginning of a recession brought about by tight money, higher interest rates and escalating inflation?

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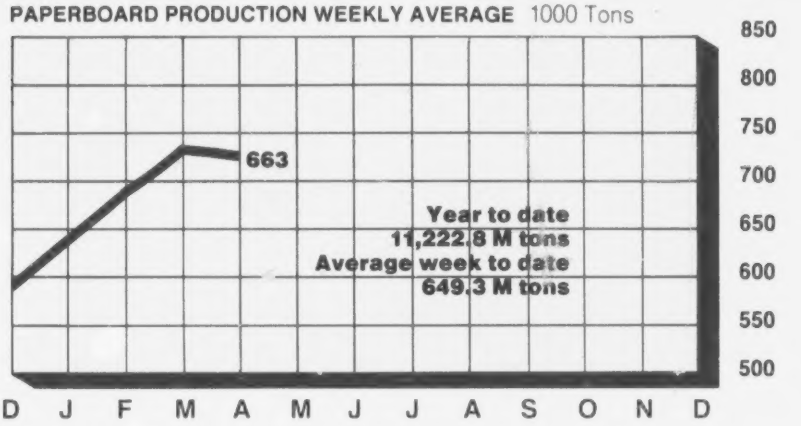
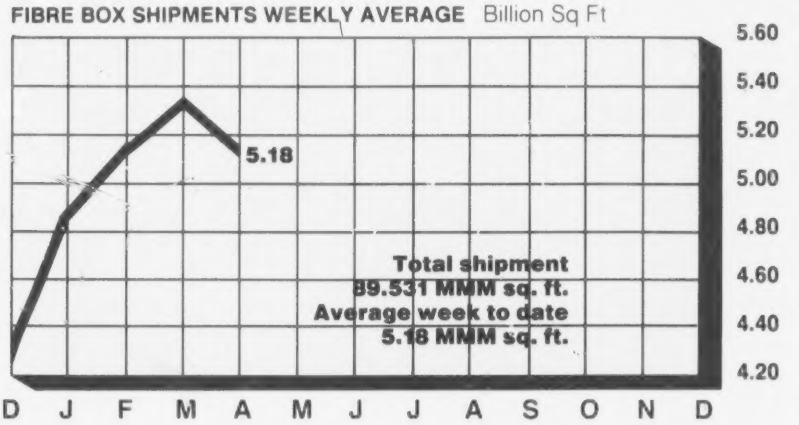


PAPERBOARD MILL OPERATIONS

The year's first third ended with an average-week production 10.3% above 1983, which had been 3.4% above the average in 1982, which had been 7.1% below '81. This indicates that the current level is well above that previously considered a "normally good" year, and suggests that perhaps the national industrial climate is rising to a new "normal" plateau. Thus, the 1984 output volume at the end of the quarter was 11.7% ahead of same-time tonnage in 1979—a year that had held the all-time annual record for production until 1983.

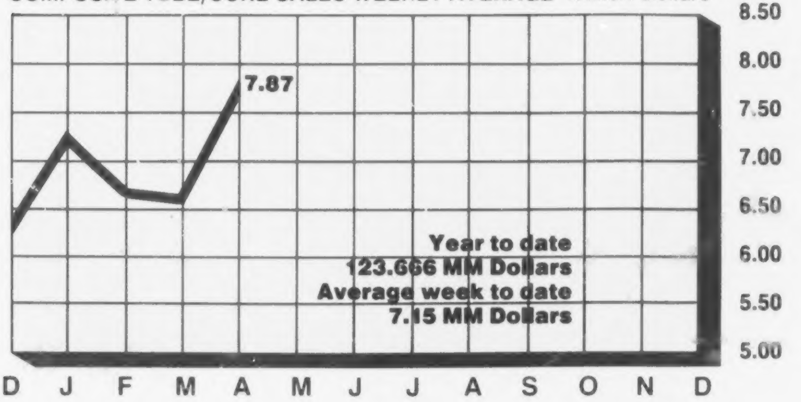
FIBRE BOX SHIPMENTS WEEKLY AVERAGE Billion Sq Ft



PAPERBOARD-TYPE PRODUCTION

In April, 2842.4M tons of board output made 2152.9M of containerboard types, up 10.6% from '83, plus 689.5M tons of boxboards, 9.6% up from last year but actually 2.2% below the volume of that 1979 month. This again illustrates the effects upon "carton" boards of long-term inroads by alternate packaging forms and materials. By contrast, materials for corrugated containers were up 15.8% from the 1979 month, since their converted products are not subject to such competition, and just had their highest quarter ever.

COMPOSITE TUBE/CORE SALES WEEKLY AVERAGE Million Dollars



RIGID PAPER BOXES

Through the first four months of 1984, "set-up" box billings were up only 2.8% from '83, which had been down 3% from '82, which was about even with '81, which had been up 10% from 1980 for major producers reporting to the National Paperbox & Packaging Association. Geographical variations remain great, with monthly extremes plus-or-minus in double digits. At quarter-end, three of the eight NP&PA divisions were below billings of last year, with severe declines in the cities and improvements in less-industrialized areas.

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JULY 1984, VOLUME 69, NO. 7

On the Cover:

Our first fullscale statistical report on buying, Census '84 gives a thorough look at purchasing of major equipment and materials in the corrugated and folding-carton converting industries.

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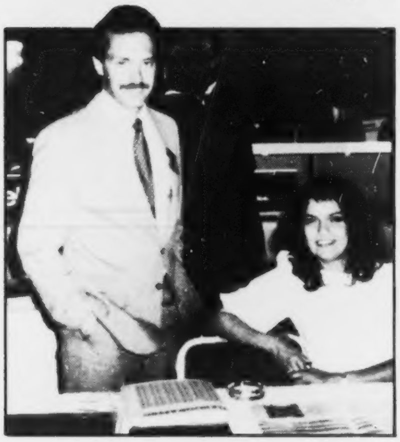

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Census '84 Shows Buying Is Brisk
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What's Wrong With Today's Corrugator?
by Mark Arzoumanian

Manufacturers and converters examine this key piece of machinery and discuss new developments, present weaknesses and possible future scenarios.

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Baling and Shredding Keeps Plants Clean
Paper recycling systems take scrap from diecutters, flexo folder-gluers and other converting equipment and squeeze it into compact bales for resale or disposal.

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Let's Make This The Best of Times
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The future looks promising, so get out in front of change, don't be swept up by it, says a top executive with one of the most successful corrugated converting enterprises in the U.S.

MEETINGS & CONVENTIONS

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FTA Forum Draws Record Attendance
With speakers and discussions on the latest technology in a blossoming field, the FTA Forum in New Orleans was geared toward four distinct areas of flexo application.

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by Robert Gitlin
Scoredraw II, a laser-diecutting software program from Precision Rule Die Inc., Wadsworth, Ohio, offers the advantage of multi-user capability.

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by Robert Gitlin
Since switching to plastic, the Racine, Wisc., plant of Great Northern Corp. has stopped losing pallets and stopped damaging its stacks of corrugated board.

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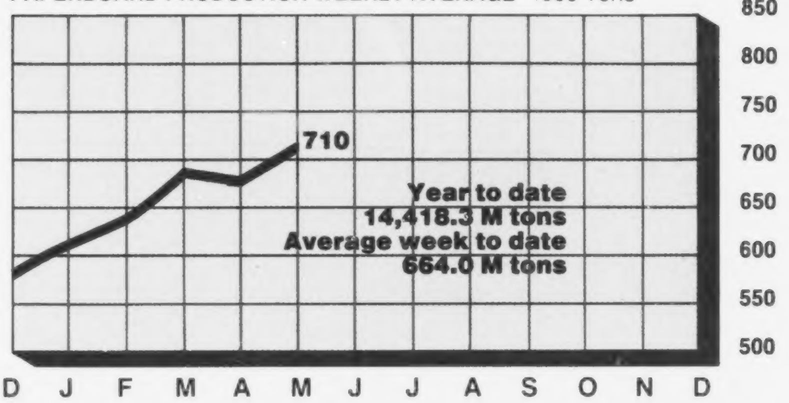
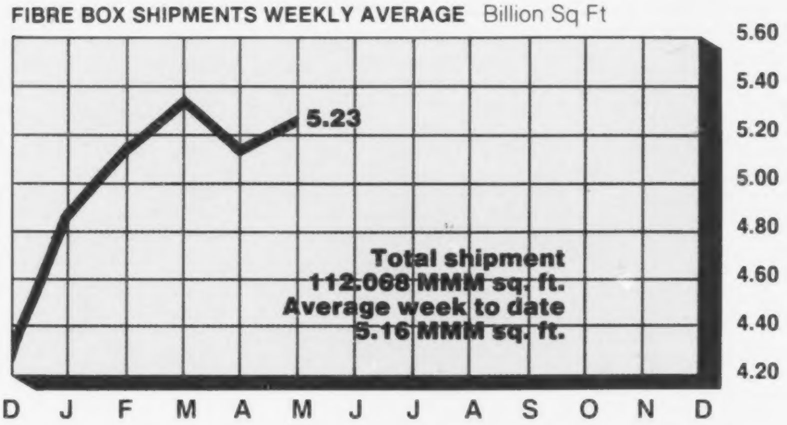


PAPERBOARD MILL OPERATIONS

The 1984 average week saw 664,000 tons produced as of May-end. This is an increase of 11.5% from that time in 1983, which was 2.9% up from '82, which had been down by 8.5% from 1981. Further, demand is sustained and strong. At end of the first five months, tonnage of unbleached sulfate furnish is still 10.8% ahead of last year, with a rise of 11.1% for semichemical, of 8.7% for bleached sulfate, and of 15.8% for recycled furnishes, with prices firm and improving, for pulps and paper stocks alike.

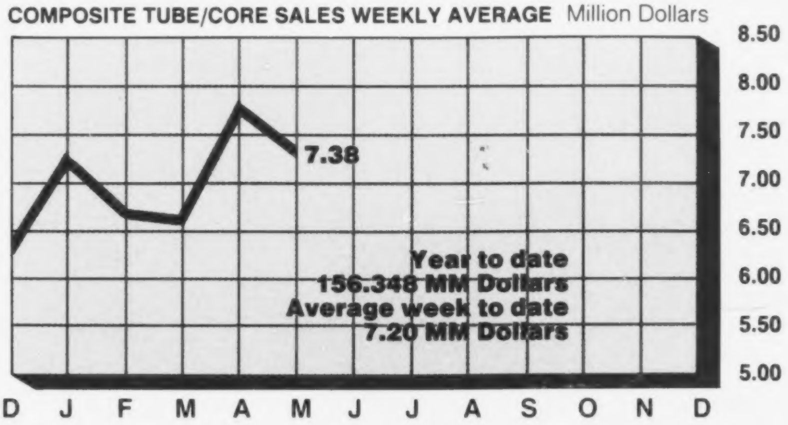
FIBRE BOX SHIPMENTS WEEKLY AVERAGE Billion Sq Ft



PAPERBOARD-TYPE PRODUCTION

May produced 3142.0M tons of paperboard, up 19.5% from the '83 month, which had been 2.8% up from '82, which had been 9.5% down from 1981. Some 2325.8M tons of containerboards were 16.8% up from '83, which had been up 3.2% from '82, which was 10.3% down from '81. The rise was 15.4% fox boxboard grades, at 816.2M short tons. The containerboard/boxboard tonnage ratio in May was thus 2.8-to-1 of earlier years, and appearing to presage a continuing decline of the boxboard packaging expansion.

COMPOSITE TUBE/CORE SALES WEEKLY AVERAGE Million Dollars



RIGID PAPER BOXES

While greatly recovered from doldrums of earlier recession, set-up boxes continue to evince the industry's most volatile packaging performance. Of the National Paperbox & Packaging Association's eight major geographical regions, all have experienced at least one month of billings down from last year, yet all have also had at least one month of double-digit "plus" business. This year, the traditional "see-saw" effect appears to be striking chiefly in the East; next year, expectably, the trend will be reversed again. In any case, the billings rise is in unit price increase; tonnage is still dropping.

paper
board
packaging
CENSUS '84

An in-depth research study of board converting operations in North America indicates that management is opening its wallet and shelling out more for machinery and materials.

Census '84 Shows Buying Is Brisk

This is *Paperboard Packaging*'s first Census report. Census '84 is a definitive, in-depth statistical analysis of purchasing of both major equipment and materials in both the corrugated and folding-carton converting industries.

It was conducted, accordingly, in two distinct parts—a survey of corrugated converting operations and a survey of folding-carton converting operations—by Infometrics, the research arm of HBJ Publications Inc. (headquartered in Duluth, Minn.).

A random sampling was taken of top management at United States and Canadian paperboard converting operations listed in the *Official Container Directory*. The percentages that emerged were extrapolated to scientifically valid and reliable estimates of total plant figures.

We're proud to report that the margin of error was as low as ±2% with some questions and never higher than ±9% with others.

We've distilled the major statistics into readable tables, bar graphs and pie charts.

Further analysis of Census '84 will appear in the next two issues of *Paperboard Packaging*—August concentrating on major-equipment purchasing and September on materials purchasing.

Corrugated

As you can see, we've tabulated our data according to corrugated converting plants *and* combiner plants. Naturally, the 644 combiner plants, which have corrugators, are also among the 1415 corrugated converting plants in the first table.

The most frequent major-equipment purchases for combiner plants are cutoff knives (15.2%), followed by corrugated stackers (8.1%) and fingerless single facers and downstackers (both 6.1%).

The full Census '84 occupies two rather substantial and sturdily bound volumes, which include information on which brands are best known by respondents. The individual reports on corrugated or folding carton findings are available for $55. The entire two-part study costs $85. Interested readers are directed to call Paperboard Packaging Publisher Richard Perkins at (312) 938-2351 or write him at 111 E. Wacker Dr., 17th Floor, Chicago, IL 60601.

The first table shows what are urgent needs and what are more back-burner considerations in the heads of top management at North American corrugated converting plants, when they take a hard look at the requirements of their facilities. This table on purchasing intentions indicates that conveyors are the object of more purchasing plans (30.3%) than are any other type of major corrugated-converting plant equipment. Following, in order, are anilox rolls (23.5%), strappers (22.2%), brakes and clutches (19.2%), flexo folder-gluers and core chucks and shafts (each 18.2%), rotary diecutters and chrome rolls (each 15.2%), and baling and scrap handling equipment, flexographic printing presses, and gluing equipment (each 13.1%).

The bar graphs indicate a definite growth in materials purchasing. Plant executives throughout North America responded they would spend more in the next 12 months on adhesives, coatings, printing plates, printing ink, cutting dies and film masters than they had in the prior 12 months. The highest forecast for the upcoming year is a $148 million industrywide expenditure for printing inks, followed by $108 million for adhesives and $92 million for printing plates.

The pie chart for adhesive types shows resins are the most prevalent in corrugated box plants today (48.54%). The pie chart for cutting dies shows most are rotary (58%), the rest flatbed (quite a difference from the folding carton field.)

Folding carton

The table on major equipment purchases in folding carton converting plants shows that lithographic and offset presses are the most frequent subject of purchasing considerations (36.2%). Close behind are gluing equipment (28%), cutters and creasers (21.0%) and coaters (20.0%).

Just as in the case of corrugated converting plants, there is definite growth in materials purchasing for the folding carton industry. Management of folding carton plants are increasing spending over the next 12 months for adhesives, coatings, printing plates, inks, cutting dies and film masters. The folding carton industry responded it would spend more money on inks ($171 million) than on anything else in the 12 months ahead. Next were cutting dies ($68 million) and printing plates ($58 million).

As with corrugated, resins prove the predominant adhesive used (49.39%), though we have a little more competition here—from latex (20.09%)—than we had in the chart from the corrugated field. The pie chart on cutting dies shows a major difference from corrugated: in folding carton plants, 94% of cutting dies used are flatbed.

Corrugated converting plants

Corrugated converting plants planning to purchase one or more units in the next 12 months

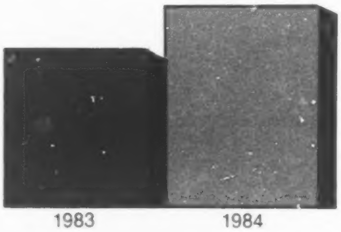
1415 total in U.S. and Canada

MAJOR EQUIPMENT	TOTAL PLANTS	PERCENT
Baling & scrap handling equipment	185	13.1
Flexographic presses	185	13.1
Letterpresses	28	2.0
Litho/offset printing presses	85	6.0
Brakes & clutches	272	19.2
Core chucks & shafts	258	18.2
Rotary diecutters	215	15.2
Flat bed diecutters	143	10.1
Drying equipment	42	3.0
Feeders	143	10.1
Flexo folder-gluers	258	18.2
Folder-gluers	100	7.1
Laminating machines	115	8.1
Conveyors	429	20.3
Splicers	171	12.1
Roll stands	57	4.0
Rollers	100	7.1
Chrome rolls	215	15.2
Anilox rolls	333	23.5
Ceramic rolls	188	13.3
Slitters	28	2.0
Stitchers	86	6.1
Strappers	314	22.2
Strippers	28	2.0
Gluing Equipment	185	13.1

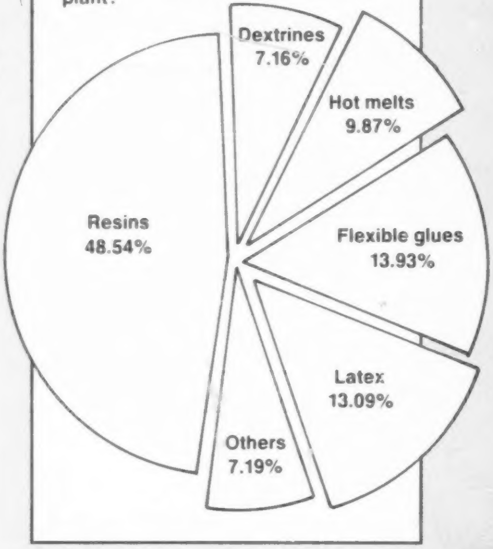
MATERIALS - ALL PLANTS

What was your total expenditure for adhesives in past 12 months?
Average per plant - $61,688
Total - $87,288,986

What will your total expenditure for adhesives be in next 12 months?
Average per plant - $76,295
Total - $107,957,425



What percentage of the following adhesive types do you use in your plant?



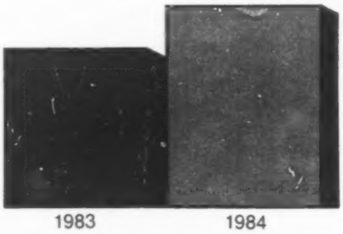
Combiner plants planning to purchase one or more units in the next 12 months

(644 total in U.S. and Canada)

MAJOR EQUIPMENT	TOTAL PLANTS	PERCENT
Corrugators	13	2.0
Corrugated stackers	52	8.1
Downstackers	39	6.1
Counter stackers	26	4.1
Cutoff knives	98	15.2
Fingerless single facers	39	6.1
Coaters	6	1.0

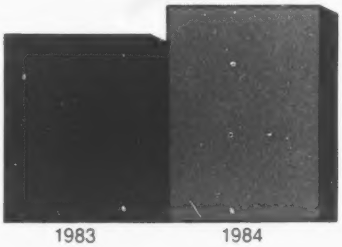
What was your total expenditure for coatings in the past 12 months?
Average per plant - $47,846
Total - $67,700,675

What will your total expenditure for coatings be in the next 12 months?
Average per plant - $57,091
Total - $80,783,765



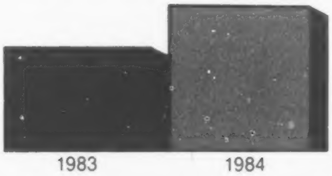
What was your total expenditure for printing plates in the past 12 months?
Average per plant - $55,364
Total - $78,339,649

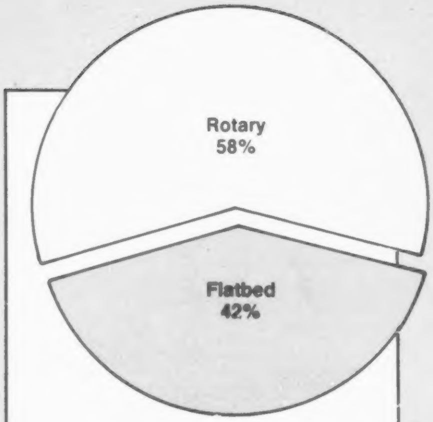
What will your total expenditure for printing plates be in the next 12 months?
Average per plant - $64,674
Total - $91,513,710



What was your total expenditure for film masters (UPC Bar Codes) in the past 12 months?
Average per plant - $2,194
Total - $3,104,510

What will your expenditure for film masters (UPC Bar Codes) be in the next 12 months?
Average per plant - $3,125
Total - $4,421,875



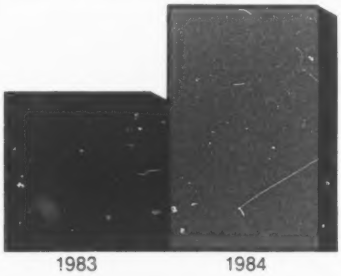


What percentage of your cutting dies are rotary? 58%

What percentage of your cutting dies are flatbed? 42%

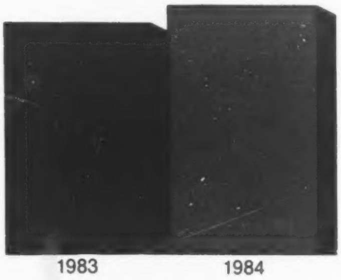
What was your total expenditure for printing ink in the past 12 months?
Average per plant - $70,546
Total - $99,822,788

What will your total expenditure for printing inks be in the next 12 months?
Average per plant - $104,857
Total - $148,372,655



What was your total expenditure for cutting dies in the past 12 months?
Average per plant - $36,445
Total - $51,571,090

What will your total expenditure for cutting dies be in the next 12 months?
Average per plant - $37,542
Total - $53,121,930



Folding carton plants

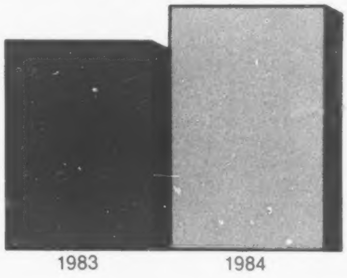
Folding carton plants planning to purchase one or more units in the next 12 months

(679 total in U.S. and Canada)

MAJOR EQUIPMENT	TOTAL PLANTS	PERCENT
Coaters	136	20
Gluing equipment	190	28
Flexographic presses	20	3
Gravure presses	14	2
Litho/offset presses	245	36.2
Brakes & clutches	81	12
Core chucks & shafts	54	8
Cutters & creasers	143	21
Rotary diecutters	35	5.1
Flat Bed diecutters	41	6
Drying equipment	81	12
Feeders	20	3
Flexo folder gluers	14	2
Folder gluers	41	6
Foil stamping equipment	7	1
Laminating machines	7	1
Embossing rolls	20	3
Chrome rolls	34	5
Anilox rolls	41	6
Ceramic rolls	14	2
Sheeters	27	4

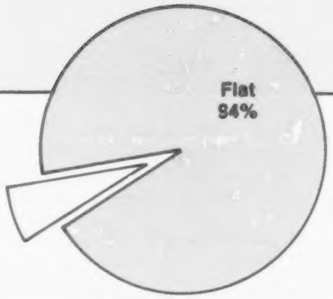
What was your total expenditure for coatings in the past 12 months?
Average per plant - $61,306
Total - $41,626,774

What will your total expenditure for coatings be in the next 12 months?
Average per plant - $71,244
Total - $48,374,676



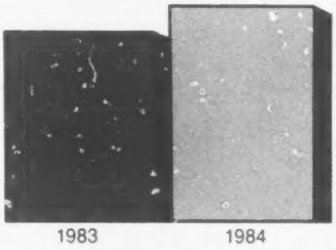
What percentage of your cutting dies are rotary - 6%

What percentage of your cutting dies are flat - 94%

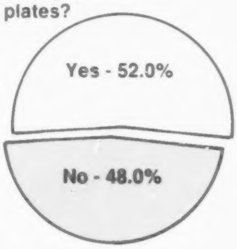


What was your total expenditure for cutting dies in the past 12 months?
Average per plant - $92,983
Total - $63,135,457

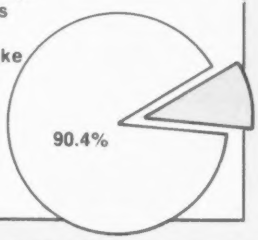
What will your total expenditure for cutting dies be in the next 12 months?
Average per plant - $100,318
Total - $68,115,922



Do you make your own printing plates?

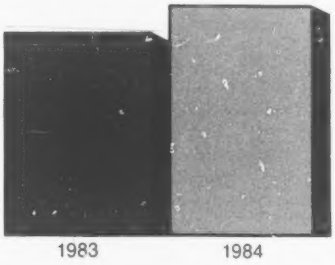


If yes, what percentage of your plates does your company make itself?



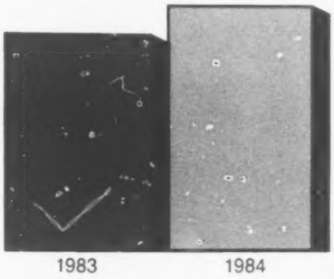
What was your total expenditure for printing plates in the past 12 months?
Average per plant - $78,494
Total - $53,297,426

What will your total expenditure for printing plates be in the next 12 months?
Average per plant - $85,146
Total - $57,814,134



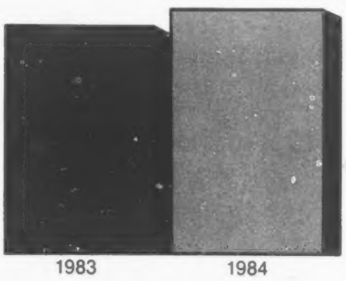
What was your total expenditure for inks in the past 12 months?
Average per plant -$232,665
Total - $157,972,745

What will your total expenditure for inks be in the next 12 months?
Average per plant - $252,176
Total - $171,227,504

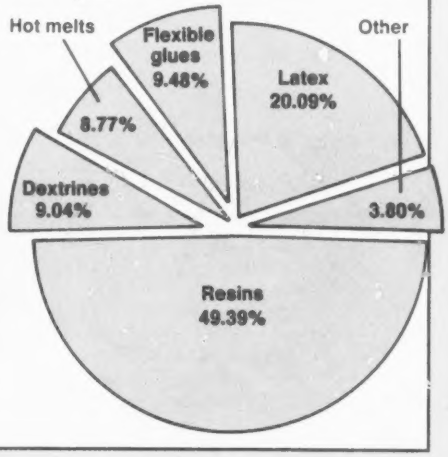


What was your total expenditure for adhesives in the past 12 months?
Average per plant - $68,375
Total - $46,426,625

What will your total expenditure be for adhesives in the next 12 months?
Average per plant - $71,949
Total - $54,285,371

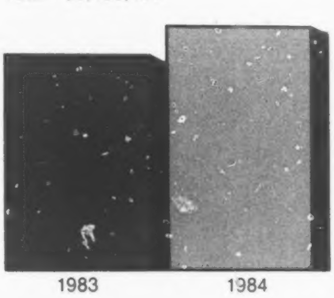


What percentage of the following adhesive types do you use in your plant?



What was your total expenditure for film masters in the past 12 months?
Average per plant - $7,461
Total - $5,066,019

What will your total expenditure for film masters be in the next 12 months?
Average per plant - $8,036
Total - $5,456,444



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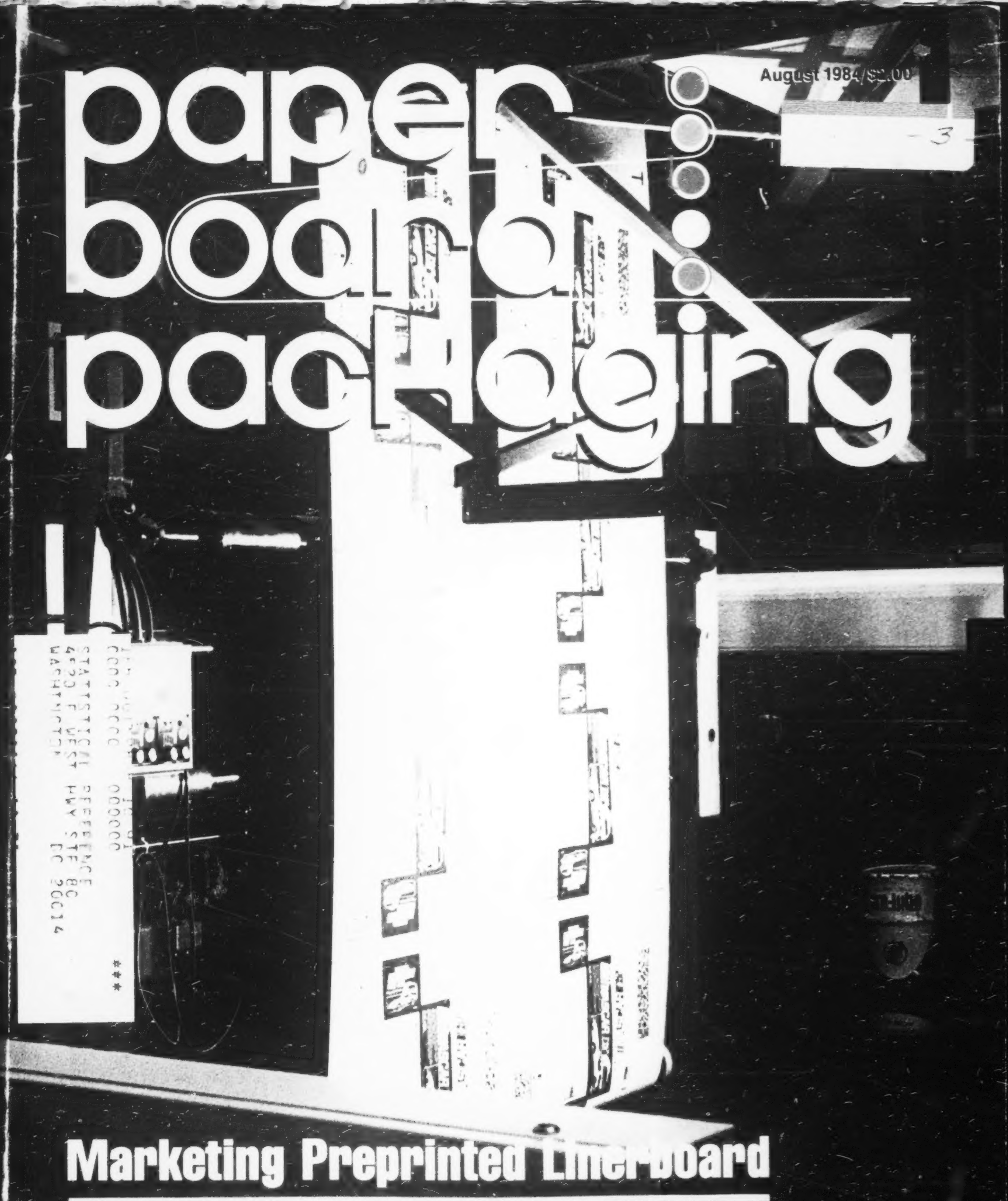
paper board packaging



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Marketing Preprinted Linerboard

Operator Training Techniques

AN HBJ PUBLICATION

paper
board
packaging
AUGUST 1984, VOLUME 69, NO. 8

On the Cover:

Preprinted linerboard, one of the biggest industry developments in years, must be marketed properly for profitable impact. Story begins on page 16. (Photo courtesy of Champion International Corp.)

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soccer
THERMOS
THERMOS
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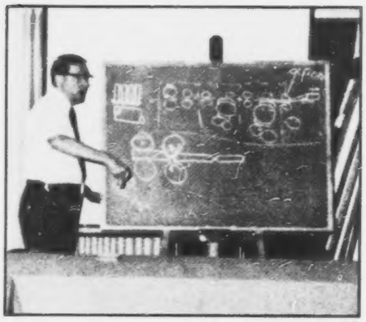
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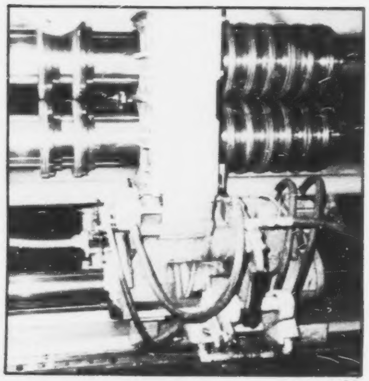
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There's more to training than showing crews how to run machines. To survive and succeed, a whole organization needs fresh direction toward the goal of productivity.

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S&S has enabled the Western Kraft plant in Bellmawr, N.J., to reduce order-change time from 2½ minutes to 13 seconds, and a continuous-run corrugator is on the way.

(continued on page 4)

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For 20 years, a chemicals manufacturer with a full line of coatings and equipment has met the needs of the paperboard packaging field with good service and dedication to quality.

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October: Corrugated Containers Report/Computers/TAPPI

November: Diecutting Update/Corrugated Case Coding

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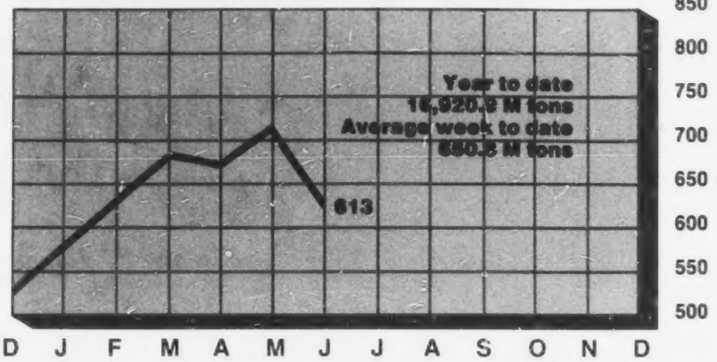
INDUSTRY
STATISTICS FOR 1984

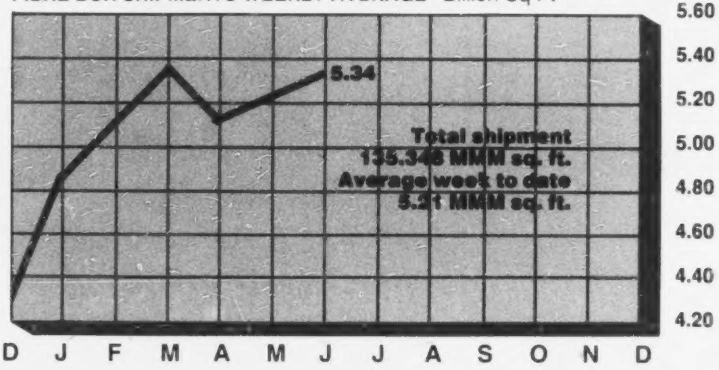
PAPERBOARD PRODUCTION WEEKLY AVERAGE 1000 Tons



PAPERBOARD MILL OPERATIONS

The first half of 1984 ended with an average-week board output 9.7% ahead of the 1983 tonnage, which had been 5.5% up from '82, which was 8.5% below '81, which was up 3.2% from '80, after a drop of 1% in '80 from '79. So go the yearly shifts and fluctuations, though they average out to a sedate annual increase, over the decades. Sad to say, containerboard demand vs. boxboards is more marked than ever, with a full 3-to-1 ratio in June—half-again above the 2-to-1 considered normal in the cartons' yesteryear heyday.

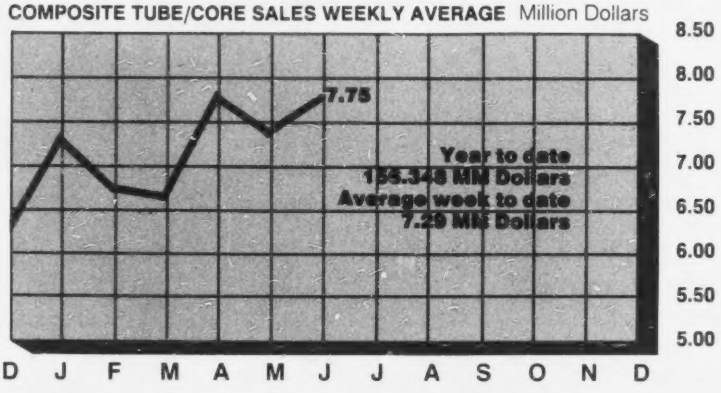
FIBRE BOX SHIPMENTS WEEKLY AVERAGE Billion Sq Ft



PAPERBOARD-TYPE PRODUCTION

In June, the output comprised some 1977.3 M tons of containerboards and 649.5 M of boxboards, as projected on basis of historic proportions from the API's reported "furnish" tonnages. To be noted is that the increase for unbleached kraft furnish (linerboard) is higher than that for semichemical. This suggests that much liner production is going elsewhere than into domestic container conversion—as witness the continued vigor of liner exports and of higher-quality (kraft) output—at expense of recycled.

COMPOSITE TUBE/CORE SALES WEEKLY AVERAGE Million Dollars

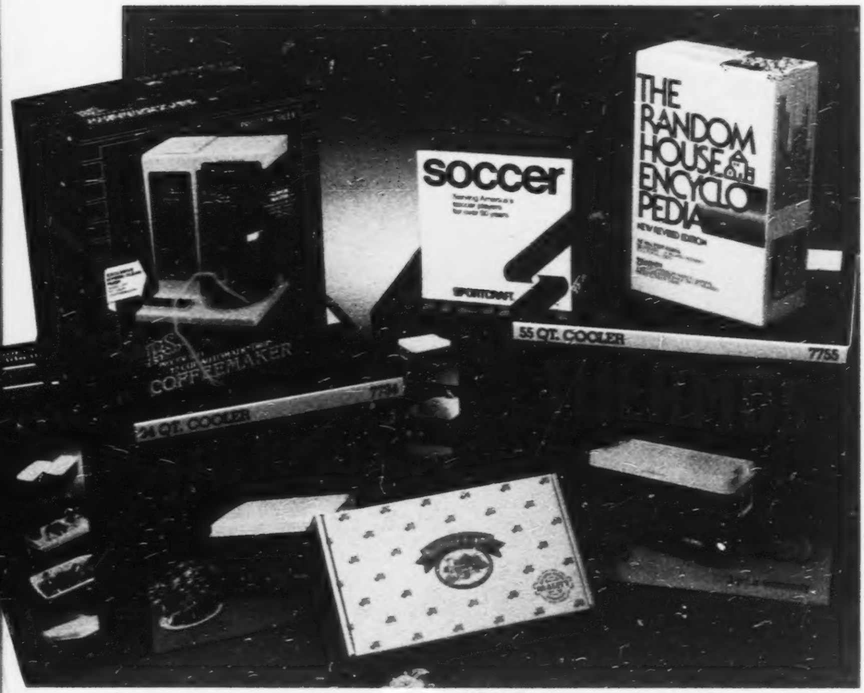


RIGID PAPER BOXES

Through the first six months of 1984 billings for rigid paper set-up boxes reported by its members to the National Paperbox & Packaging Association varied wildly, with some areas showing double-digit improvements over 1983 in one month and deficits in the next, and with some showing increases of more than 100% while others were down. It may be that this scene denotes some permanent evolution, since set-up boxboard consumed in 1983 was at its lowest ebb in reported history, down by 48% from 1973.

Will corrugated converters ever realize there are customers out there willing to pay for quality? A golden opportunity for substantial profits is staring them right in the face.

Will Marketing Be Preprint's Achilles' Heel?



Some excellent examples, courtesy of Schiffenhaus Packaging Corp., of preprint packaging in a variety of industries

by Mark Arzoumanian
Editor

If you've heard it once, you've heard it a thousand times. You may have the greatest product, plant, or capability in the world, but if the world doesn't know about it, so what? What do you have to do to get noticed?

Market it properly.

Until fairly recently, the corrugated-container industry has been known as the "plain brown box" industry. Preprinted linerboard is a concept whose time has finally come.

The technology is there for those who want to take advantage of it. Although every end-user does not need preprint quality, there are enough out there more than willing to pay it *if* they are properly educated on the benefits of enhanced graphics.

Can this industry meet this marketing challenge and substantially alter its less-than-glamorous image? Will it be able to finally earn some significant profits through the proper marketing of preprint? Or will it soon lose sight of the fact that there are customers out there willing to pay a price for quality? In 10 years, will preprint be marketed like the brown box is today?

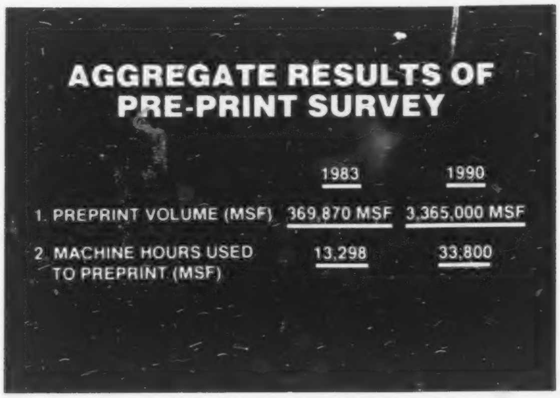
These were some of the questions posed by *Paperboard Packaging* as it again examines developments in the preprinting of linerboard (see February 1983). The focus here will not be so much on companies involved and the presses they have purchased as on the marketing of preprint both now and in the future. In this regard, a lot of the information presented here is courtesy of Laurence (Chip) Schiffenhaus Jr., Schiffenhaus Packaging Corp., who gave a comprehensive talk on the preprinted-liner market at the Flexographic Technical Association's Annual Meeting in New Orleans last May.

In answering the above questions and more, it is first necessary to find out how companies successfully producing preprint *today* are going about marketing it.

Relative economics

"End-users have to fully understand the product both graphically and in terms of the relative economics of competitive products," says George Jamison, vice president and general manager at Schiffenhaus. "We find out a customer's needs and work with him on an individual basis. We don't say, 'We're going to sell you preprint.' It is just not the way it is done."

Jamison points out that preprint hasn't made a major penetration of any one specific market. What have been some of the barriers? As pointed out in Schiffenhaus's FTA speech, they include limited supply and a consequent lack of commitment on the part of end-users, geographic limitations, limited customer awareness, a resistance to change, a lack of standardization, limited producer knowledge (especially in the sales area), and the high cost of plates



AGGREGATE RESULTS OF PRE-PRINT SURVEY

	1983	1990
1. PREPRINT VOLUME (MSF)	369,870 MSF	3,365,000 MSF
2. MACHINE HOURS USED TO PREPRINT (MSF)	13,298	33,800

TABLE I

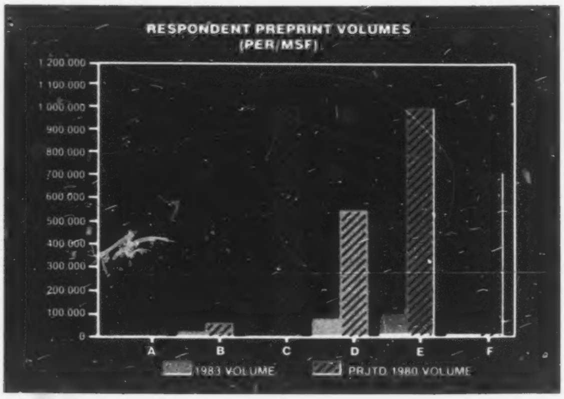


TABLE II

and separations for process work.

Bob Draper, preprint manager at Pioneer Container Corp., echoes Jamison's opinions regarding the proper way to market preprint:

"You have to make sure the customer is aware of the capabilities and limitations of flexo, and make certain he knows what kind of graphic reproduction to anticipate. You don't sell preprint as equal to litho lamination. The customer has to make a value decision that comes down to quality versus cost."

Says Mentz Billingsley, general sales manager for preprint at Container Corp. of America, which has been producing preprinted linerboard for close to three years: "It's very important to sit down with the key decision-makers and tell them what preprint is and where it is going. There have been significant changes in the merchandising environment as more and more items are being sold in packaging. Very seldom can you find a sales clerk in stores to sell the product. You can't rely on two-color distribution graphics on a brown box. The package has to sell the product."

Where's the market?

Before going any further, it's important to pinpoint where the preprinted-linerboard market stands today and how it will grow. The market survey conducted earlier this year by Schiffenhaus Packaging provides a pretty accurate picture. Six major suppliers of flexographic preprinted linerboard in North America participated in the survey, which consisted of eight questions. The accompanying six tables and charts give you a focused and reliable picture of a market that until fairly recently was simply too small to measure. However, it is worthwhile to expound on CHART I.

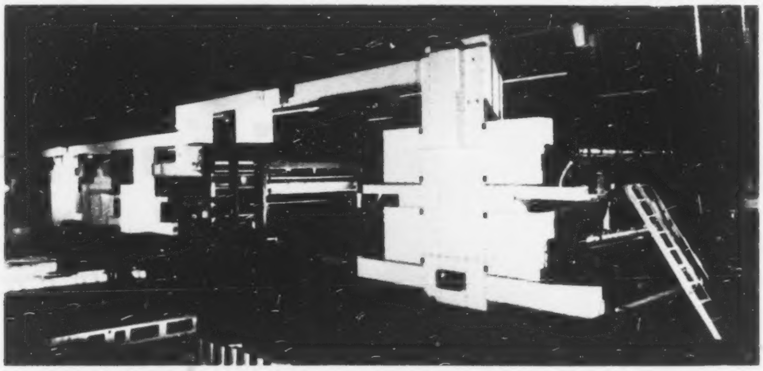
"I don't think the market for preprinted linerboard will ever be saturated," says Lee Stalder, manager of marketing services, MacMillan Bloedel Containers. The company has a preprint operation (using a Flex-O-Line press) at its Union, N.J., plant. "Such areas as lighting, point-of-purchase displays, liquor, beer, and even produce are just being embarked upon by preprint."

Says Draper: "We're not opening doors to new markets because we never knew we could open them. It's that old corrugated mentality. People are operating under rules and guidelines of many years ago. There is a lot that we don't even know about today. Any market that requires point-of-purchase displays will have use for preprint. A wide spectrum of print quality will be available."

Vince Silvestri, product manager for preprinted linerboard at Union Camp, looks at this subject in a broader perspective: "You have to look at markets for preprint from the customer's point of view, and these customers have to be quality-oriented. It's more a matter of philosophy than a particular market to go for. There are many, many segments and you're limiting yourself if you focus on one market." Union Camp recently purchased a custom-built press from Cobden Chadwick and plans to be preprinting linerboard before the end of this year.

"There's going to be large growth in the food industry and retail packaging, as shipping containers will be used as retail displays," notes Jim Keune, sales manager for Champtone, the preprint division of Champion International Corp. Champion has been preprinting linerboard for 2½ years on a Conprinta flexo-belt press. "Over the past few years, there has been an incremental packaging upgrade, and preprint is the end result. Three years ago there was no preprint market and a limited number of people talking about it. Now there is a large number of people talking seriously to users about what preprint can do. Ink- and plate-supplier abilities have vastly increased as they go after this market, and the same goes for machine capabilities."

"The food and beverage market has large potential, specifically the beer and soft drink industry," says Jamison. "That is why we are going into Canada. Beer is marketed differently there. Also, the printing conversion (from letterpress to preprint) means that the economics are closer than in the U.S." Schiffenhaus just announced the formation of a joint-venture company, Schiffenhaus Canada Inc., which will be a trade preprint operation to serve the Canadian corrugated-container industry. The company will be formed with The Packaging Group of Domtar Inc., Malton, Ont., and MacMillan Bathurst Inc., Mississauga, Ont. Its *only* purpose will be to produce high-quality "PREflex" preprinted liner for Canadian and U.S. markets. The company also announced it will buy an 88" web flexo press for this operation. The plant will be



This Cobden Chadwick seven-color Linerflex press is the largest (98") the company has ever supplied and was installed late last year at Altonaer Wellpappenfabrik in West Germany.

at an as-yet-undetermined site in Ontario. Start-up is planned for mid-1985.

Now to the crux

Okay. The market is there and will be growing. It's time to answer the questions posed at the beginning of this article. Can this industry market preprint for profit five years from now, or will converters lose sight of the fact that there will *always* be customers willing to pay top price for quality? What will happen when new converters enter this specialty market? Will quality lose out to volume?

"You have to understand that there's the idealistic viewpoint and the realistic viewpoint," says Draper. "Ideally, the customer pays for what he gets and is willing to pay for the improvement in what he's getting. However, with the additional printers coming into the market, people will be looking for ways and means to fill the presses when installed, and they might start selling preprint containers like existing brown boxes—setting pricing standards. Box plants are mill-driven and people in this industry don't know how to sell for the higher price."

Draper adds that integrated box plants tend to aim for the lower-end/high-speed-and-volume portion of the market, reducing price and quality, while the independents shoot for the high end of the graphics market.

Larry McVicker, vice president of marketing and new business development, Packaging Corp. of America, believes that as more preprint suppliers get into the market, profit margins will be lowered, "but not to the severity of brown boxes." PCA is currently buying its preprinted linerboard from two outside sources.

"The materials are different," he says. "The linerboard is clay-coated. It's limited in supply and sells for considerably more. It's a supply-and-demand market. If you want to keep your profit margins, you'll have to upgrade quality."

"Long-term, pricing is a definite danger and it will become more competitive," says Silvestri. "But there is a very strong skill level required in order to provide quality. The skill factor cannot be ignored."

"Preprint is a specialty product that can be looked at in different ways, including a more efficient manufacturing process," says Keune. "The economics are completely different. For example, if, because of preprinting, you can save on board weight, that's a significant portion of total cost. In the years ahead the market price might be less but preprint will provide for a most cost-effective manufacturing concern."

What about penetration?

Of course, both the current and future market for preprint must be put into perspective, because everyone agrees that preprint will not be needed or wanted by every end-user, no matter how high the degree of quality. In 1983, total corrugated shipments, as reported by the FBA, reached 252,000,000 MSF. Based on the Schiffenhaus survey, that means that the total demand of 369,000 MSF of preprinted linerboard in 1983 was just 0.15% of total shipments. Assuming a growth rate of 3% for corrugated shipments through the rest of the 1980s, total shipments in 1990 will be about 310,000,000 MSF, according to research done by Schiffenhaus. The projected demand of 7,851,665 would then be only 2.5% of total shipments. If total production capacity was filled (estimated at 12,350,000 MSF), preprint would then comprise 4% of total shipments. Obviously, other "competing" methods of enhancing

FORECASTED PREPRINTED LINERBOARD SALES IN 1990

PRESSES ON HAND	3,365,000 MSF
PRESSES ON ORDER	1,682,499 MSF
PRESSES TO BE ORDERED	2,804,166 MSF
TOTAL DEMAND IN 1990	**7,851,665 MSF**

TABLE III

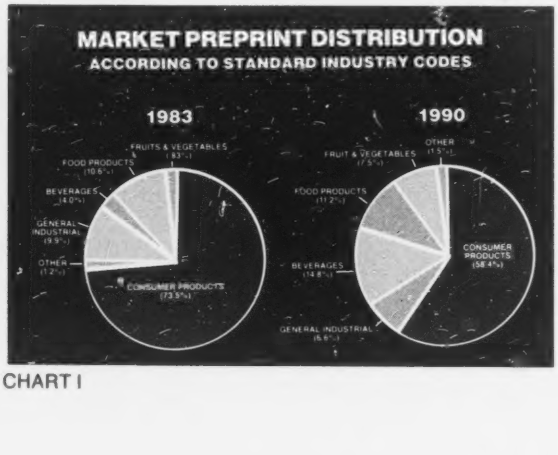


CHART I

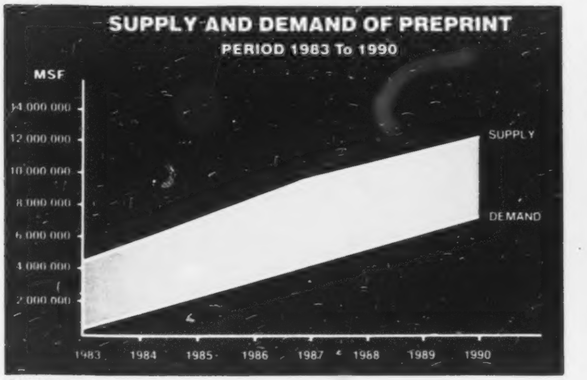


CHART II

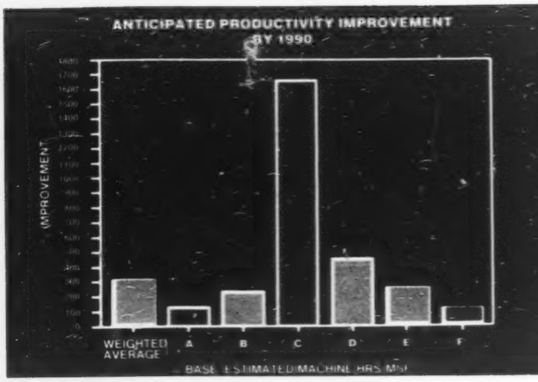


CHART III

container graphics (including litho laminating) aren't going to disappear anytime soon, although continuous advances in preprinting will keep suppliers of such other methods on their toes.

Speaking of penetration, will preprinted linerboard be able to take away business from the folding-carton industry? To a limited degree, yes.

"The economics of E-flute and preprint are such that only a portion of the folding-carton market will open up, but it won't be a large portion," says Jamison. "There will be advantages in E-flute over folding-carton but a person has to be willing to pay for the benefit."

"A lot of beer cans are in folding cartons, so the marketing is important," says Draper. "Cans are becoming thinner and thinner, and the folding carton doesn't have the cushion to protect the cans from being damaged and leaking. The graphic quality in flexo preprinted liner is there but there has to be a requirement for corrugated first."

Technology pros and cons

In Schiffenhaus's presentation at the FTA Annual Meeting, he cited a number of technological advances associated with preprinted linerboard. These included wider presses, new inking systems (such as dual doctor blades), larger and thinner plate materials, ink and coating improvements, ceramic rolls, better color separations, the higher quality of certain grades of linerboard, and the ability to run split rolls at the double backer. However, this is not to say that there isn't room for improvement. Specifics in this area include more accurate mounting systems, a means of inexpensively proofing printing plates and being able to accurately predict the final result.

What in the way of new technology have suppliers been coming up with? A recent innovation in Cobden Chadwick Ltd.'s (Oldham, England) Linerflex press is the ability to register the in-line flexo units with the four-color process units situated around the drum. Automatic-registration equipment can be used either to register the additional in-line units to the colors around the drum, or to register the in-line units with each other. This way, either all the units can be used to print a multi-color job, or the four-color drum can be set up for one job while another job is being printed on the in-line units, substantially reducing downtime.

Windmoeller & Hoelscher Corp. (Lincoln, R.I.) has a new Olympia 964 close register single bull gear stack press which possesses a small plate to web contact area, reduced impression pressure and register accuracy of 0.004" due to direct drive of all printing decks from one central "bull gear." Owens-Illinois has ordered an Olympia 964 (88" wide) for delivery in the latter part of 1985.

General Web Dynamics, Rockford, Ill., is a classic case of a company introducing technology used for other industries—folding-carton, plastic-film-converting, etc—into the preprinting operation. Its automatic-web-guiding system (CAT-1000) utilizes standard components in a special configuration for the corrugated preprint application. For this application, the optical sensor detects and follows the preprinted liner from below. Through electronic slaving potentiometers, the electro/hydraulic power units move the triplex shaft proportionally to the movement of the chasing sensor. Several installations of the CAT-1000 have been made in the U.S. market and accuracies of ± 1/32" slit-to-print have been reported. Finally, it should be noted that optical guiding systems can be employed as edge-guiding systems on brown board runs between preprint orders.

What about the future?

After talking to dozens of executives intimately involved (or about to be) in preprint, one thing is clear: the process is not in any danger of not winning over customers because suppliers don't know how to fully market it. However, the words of Ron Glick, vice president and general manager of converting operations, Owens-Illinois Inc., must be heeded:

"It might be a little brash for me to say, but today's exceptional quality could become tomorrow's standard. That's the level of quality the corrugating industry is moving to." In other words, relying on past printing accomplishments for future revenues could be very hazardous to your business!

"Preprint liner will continue to make a most dramatic impact on this industry," says Draper. "The demand for the product will still be high for years to come. People are ordering preprint presses to run with corrugators, and corrugating plant equipment will be designed for the maximum use of preprinted linerboard. The flexo press will be the catalyst. Other machinery will have to be geared to it. Preprinting could very well eliminate the flexo part of the flexo folder-gluer because corrugated is such a poor surface to print on. We are more excited about preprint today than we ever were." ☐

NOTE

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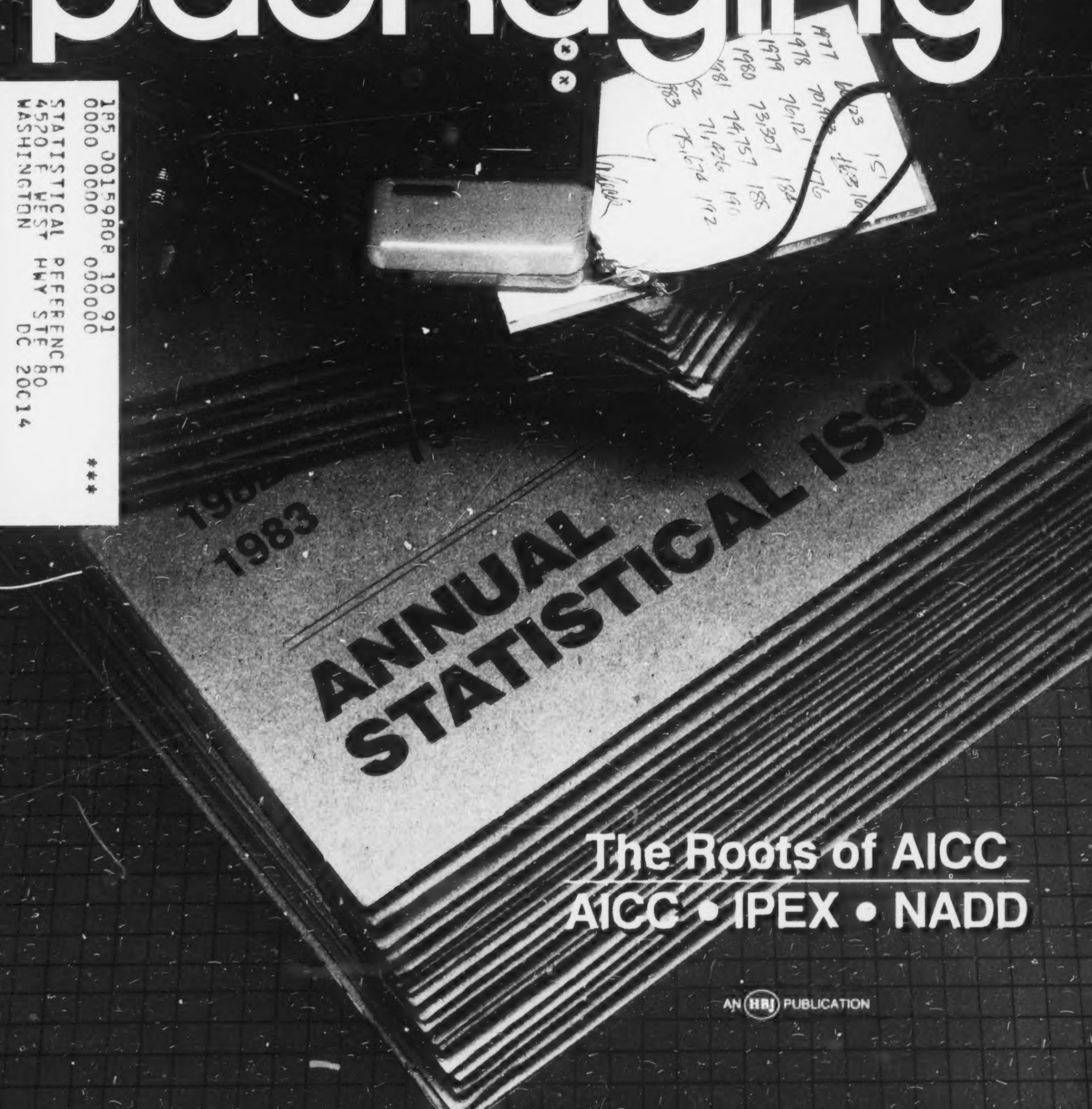
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ANNUAL STATISTICAL ISSUE

The Roots of AICC

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paper
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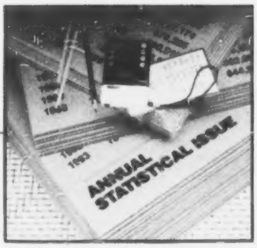
SEPTEMBER 1984, VOLUME 69, No. 8

On the Cover:

Once again, *Paperboard Packaging* presents the most complete single compilation of statistical data on the paperboard industry in its yearly statistics feature. Starts on page 18.



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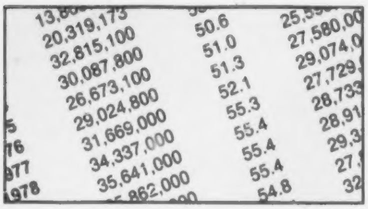

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Now that a Georgia box plant has a nonstop corrugator, its converting equipment must be updated and more space must be added to handle the stepped-up volume of board.

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When employees see the need to curb benefit-program costs, those expenses stop being dead weights on the bottom line and sources of unnecessary antagonism at bargaining tables.

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November: Diecutting Update/Corrugated Case Coding

December: Industry Calendar/Packaging Designing

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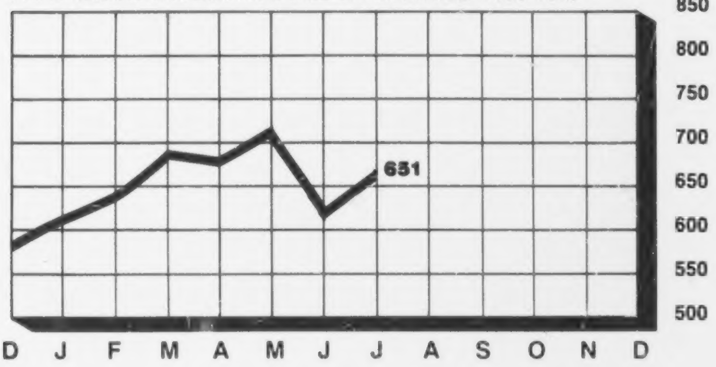
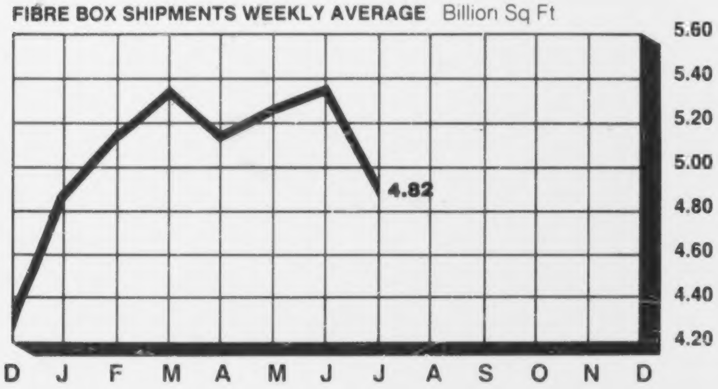
INDUSTRY
STATISTICS FOR 1984

PAPERBOARD PRODUCTION WEEKLY AVERAGE 1000 Tons



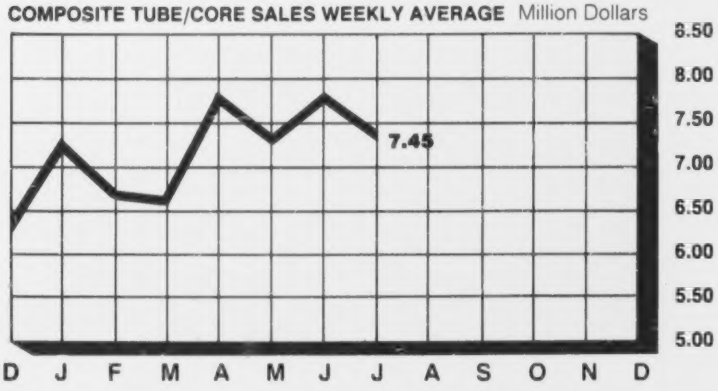
PAPERBOARD MILL OPERATIONS:
The first month of 1984's second half marked a continuation of the upturn in earlier quarters. July's volume of 2871.8 M tons was up 13.6% from the 1983 month, which had been 23% up from the '82 month, which was down 23% from '81, which had been up 8.4% from 1980. Thus, a return to traditional levels of output margin is appearing. This may be due in part to the reduced downtimes for vacations and maintenance, because of improving business. However, production of board varies greatly with region.

FIBRE BOX SHIPMENTS WEEKLY AVERAGE Billion Sq Ft



PAPERBOARD-TYPE PRODUCTION:
In July, 2187.2 M tons of containerboard was up 16.1% from that month of 1983, while 693.6 M tons of boxboards reflected a rise of 7.7%—both as projected from the API's "production by furnish" data. This devastating tonnage ratio of 3-to-1 compares with a traditional 2/1, suggesting that the overall packaging recovery is chiefly one of distance container shipments, rather than small-box business. Thus, the month's boxboards tonnage, though well above recessive periods, was no higher than a half-dozen years ago.

COMPOSITE TUBE/CORE SALES WEEKLY AVERAGE Million Dollars



RIGID PAPER BOXES:
Through July, major set-up boxmakers report a national rise of some 9% in total billings from 1983, compared with 10% in '83 over '82, 8% in '82 from '81, 11% in '81 over '80, and 7% in '80 over '79. Thus, although the annual improvement is steady and consistent, dollar-value in the rigid box market has not kept pace with inflation on a long-term basis. Further, the "point spread" is great, between and among regions, with double-digit improvements in some areas and declines in others; which is why the "mom and pop" shops died out.

As each week of containerboard production tops the one before, the industry's contentment is becoming tempered with worries about a possible raw-material-supply shortage from the mills.

How Long Will Good Times Last?

by Fred Sharring
Senior Editor

"This business is going at top speed in more directions than I knew there were," said one of the packaging industry's senior managers, addressing a mid-year conference. "I never before heard so many people saying 'I never before saw so much (or so little) thus-and-so at a time when thus-and-so.' "

He could hardly have put it more briefly or more accurately. Economic vigor of the present sort, in any previous experience, would have generated only enthusiasm and encouragement. And yet, in spite of record-setting production rates, under sustained and rising demand, with improving prices and profits, there seems to be an air of some deep unease underlying the operation.

Not many months ago, the question was "When, if ever, will the good times return?" Now, the concern evidently is "How long will they last?"

In truth, the quality and quantity of this current business recovery is downright astounding. Corrugated container demand is one bellwether example. Beginning with the close of last year, fibre box shipments have gone month after month breaking all records for that calendar period. Never before had there been even two such consecutive months. In response to that, containerboard production is also at an all-time high, double-digit percentage points above '83, which had just set a new tonnage record. With minimal exceptions, each successive week of 1984 has exceeded the previous average week—another record, by far.

Just possibly, that gives a clue to this unease in the midst of plenty. The day of undercapacity, and of attrition to under-maintained equipment, may very well be threatening, again.

It's as simple as this: Last year, U.S. mills provided some 32.2 million short tons of packaging boards, as seen in the following Paperboard Mill data section. This year, volume has been running around 10% ahead of that, or about 35.4 million tons to be expected for all of 1984.

But the total mill capacity projected by the American Paper Institute, on basis of existing commitments, is only 35.5 million, and with roughly another 1% increase seen for 1985. Those bare figures entail a machine utilization rate above 100%, entering the second half of this decade—and with almost no new production facilities planned at present.

So, the day of the monster appears to have arrived. In the absence of a miracle, this packaging industry must be faced with near-future stringencies in raw material supply, of a degree and duration that can only be conjectured. And that is more than a mere irritating inconvenience. It is a chaos that opens the way to still further successful competition by non-paper packagings, at a time when the industry most distinctly needs no more.

As one example—this is the year that marked one of paperboard packaging's most dismal setbacks. Major oil producers are shifting from the composite can to the blown plastic bottle for one-quart motor oil packaging. The changeover is based upon valid and responsible market tests, but that end-use has been taking some 36% of the composite cans' total industry output volume. It makes for a sad requiem to so much research and development effort by so many, for so long.

On the other hand, much of the news is good, and even excellent. For many forest products companies, net profits in the year's first half were double and triple those of same-period 1983. The prices of materials and converted products have been improving steadily. (A wry note in that regard is that the kraft linerboard price "sat" unchanged for a decade, between 1963 and '73. In the 10-odd years since then, there have been 18 changes for the same material!)

Above all—the U.S. citizen continues his love affair with packaging. The average American spent an average total of $83 for it last year—up 80% in the decade—to bring home his exotic comforts from the far places.

This is not the first time that his packaging industry has entered a new, and in many ways disturbing, setting of scene. In all likelihood, another 10 years will find him paying yet another 80% for its services, and more than happy with the opportunity.

Paperboard in the General Economy

Table A-1: Total U.S. production of paper plus paperboard in 1983 would appear to be below the tonnage of some previous years, and indeed the paperboard volume shown is below that of recessive 1982, and even of 1973. However, as footnoted, those previous years' data were compiled by federal agencies, among others, and include certain non-packaging boards not included in American Paper Institute summaries. These reports are no longer developed by federal agencies. Accordingly, in this and future years, the board tonnage shown will reflect packaging-related materials, as recognized by the API.

Table A-2: A 550.6-lb share of the country's paper and board output accrued to each of its citizens in 1983—approximately nine times the portion of the average citizen elsewhere in the world, including those of the more industrialized countries.

However, these 1983 totals suggest that U.S. per-capita paperboard use, in a relatively vigorous year, was below that of most years in the decade. To complete the anomaly—paper grades' consumption is shown at a record level.

This contradiction arises from three major factors. One is the elimination of those non-packaging boards previously included in now-discontinued government reports. Another is the significant takeover of some paperboard applications by alternate packaging materials.

A third factor is the tremendous increase in paper-grades consumption, with the rocketing proliferation of the data processing/reporting area, and the sudden and welcome resurgence of printed publications in many field.

Table A-3: In each average day of 1983, the average U.S. citizen accounted for nearly three paperboard containers of the basic types listed—more than 1000 per person during the year. And that does not include an estimated 32 billion milk cartons, about 150 per year, along with the various other specialties that bring individual use much higher.

However, a wide variation is visible in the long-term demand for these basic package types. Thus, across 20 years, the national daily consumption of fibre boxes is up 115%, while that of folding cartons rose only 18% and rigid paper set-up box units actually dropped 12%. With an increase of nearly 200% for the grand champion—composite cans/tubes—the national total of those listed went up 33% in the double-decade.

Table A-4: One of the rarest events in packaging industry history is a decrease, from any previous year, in the total annual value of converted paperboard products. Yet the 1983 record is such an occasion—down slightly from banner-year '81, though up 103% from 1973, and 330% higher than two decades ago.

Product-value advances, respectively for the year and the decade, are: fibre boxes 5.4/102%, folding cartons 0.8/38%, set-up boxes 10.1/68%, and all other converted board products 15.6/104%.

Among victims of political and legal evolutions is the computation of value-added, from raw materials to converted products. Pricing information is no longer discussed by industry associations or compiled by the government.

A-1 — Board & Tonnage Relatinship (tons)

Year	Paperboard	%	Paper	%	Tctal Paperboard and Paper	%
1943	8,620,400	50.6	8,415,300	49.4	17,035,700	100.0
1953	13,865,300	52.1	12,739,300	47.9	26,604,600	100.0
1963	20,319,173	52.1	18,692,587	47.9	39,011,760	100.0
1973	32,815,100	53.1	29,014,900	46.9	61,830,000	100.0
1974	[illegible]	[illegible]	29,421,100	[illegible]	[illegible]	100.0
1975	26,673,100	51.0	25,595,900	49.0	52,269,000	100.0
1976	29,024,800	51.3	27,580,000	48.7	56,604,800	100.0
1977	31,669,000	52.1	29,074,000	47.9	60,743,000	100.0
1978	34,337,000	55.3	27,729,000	44.7	62,066,000	100.0
1979	35,641,000	55.4	28,733,000	44.6	64,374,000	100.0
1980	35,862,000	55.4	28,912,000	44.6	64,774,000	100.0
1981	36,364,000	55.4	29,317,000	44.6	65,681,000	100.0
1982	33,842,000	54.8	27,888,000	45.2	61,730,000	100.0
1983	32,176,700	49.4	32,962,200	50.6	65,138,900	100.0

Source: Through 1982, Bureau of Census and U.S. Pulp Producers Assn. Paperboard tons exceed classification of American Paper Institute in Paperboard Section of this issue through inclusion of certain boards not classified in institute figures.API thereafter.

A-2 — Per Capita Production, Paperboard & Paper (pounds)

Year	U.S. Population	Paperboard	Paper	Total Paperboard & Paper
1943	136,485,262	126.3	123.3	249.6
1953	159,636,000	173.7	159.6	333.3
1963	188,616,000	215.5	196.2	413.7
1973	210,404,000	311.9	275.8	587.7
1974	211,090,000	284.0	277.7	561.7
1975	213,641,000	249.7	239.6	489.3
1976	214,659,000	270.4	257.0	527.4
1977	216,383,000	292.8	268.8	561.6
1978	218,228,000	314.7	254.1	568.8
1979	220,099,000	323.9	261.1	585.0
1980	223,174,000	321.4	259.1	580.5
1981	226,292,000	321.4	259.1	580.5
1982	230,547,000	293.6	242.0	535.5
1983	233,662,000	272.0	278.6	550.6

Source: Based on Table A-1 and mid-year population estimate of Bureau of Census

Wood Pulp

Table B-1: U.S. domestic pulp production reached an all-time high tonnage in 1983, up 14% from 10 years ago and 83% in 20 years. Imports were up a full 22% from '82, with the expansion in U.S. paper/board demand—more than seven times the average rise over 10 years.

Pulp exports also exceeded all previous years, by a wide margin, up 22% from 1982, or nearly three times the decade's average annual increase.

That, unfortunately, reflects the relatively doleful economic scene in many overseas areas, where costs of raw materials and processing are far above those we find oppressing. In some non-oil-producing nations, across both oceans, the expenses of operation are so

continued on page 22

A-3 — Principal Paperboard Packages Used, Per Day & Per Year*

M containers used per day

Year	Corrugates & Solid Fibre	Folding	Set-up	Cans & Tubes	Drums	Total Per Day	M. Containers Total Per Year
1943	12,360	163,000	17,980	5,360	26	198,726	72,525,000
1953	22,800	268,000	20,500	15,900	75	327,275	130,946,300
1963	35,222	410,000	15,284	23,900	88	484,500	176,842,500
1973	65,888	489,839	16,580	53,346	145	625,798	228,416,300
1974	62,427	482,337	14,689	56,360	153	615,966	224,829,700
1975	56,175	448,574	11,082	53,451	130	570,582	207,930,300
1976	62,972	488,496	12,068	59,705	151	623,392	227,694,000
1977	66,123	497,350	13,070	64,303	163	641,009	233,968,000
1978	70,983	515,254	14,168	66,993	176	667,174	243,685,300
1979	76,121	517,892	15,058	69,070	184	678,325	247,758,200
1980	73,307	505,453	14,671	67,296	188	660,915	241,234,000
1981	74,757	499,799	14,337	67,824	190	656,907	239,771,000
1982	71,426	491,318	13,584	66,234	192	652,907	238,292,000
1983	75,674	484,442	13,394	70,664	199	644,373	235,196,000
1983 Per Capita Use	0.328	2.067	0.050	0.306	0.0008	2.752	1.005

*Exclusive of certain sanitary containers.

A-4 — Value of Principal Converted Paperboard Products Shipments

Year	Fibre Boxes	Folding Cartons	Rigid Boxes	Other Converted Board Products	Grand Total
1943	$492,068,100	240,830,000	104,700,000	194,600,000	1,032,216,000
1953	1,315,190,400	764,866,300	240,000,000	583,800,000	2,903,876,700
1963	2,065,659,200	959,800,000	247,307,000	1,208,800,000	4,484,205,900
1973	4,862,056,300	1,460,000,000	484,950,000	2,751,281,000	9,558,287,300
1974	5,792,984,900	1,694,980,000	536,900,000	3,246,641,000	11,271,505,900
1975	5,623,765,200	1,755,000,000	483,155,000	3,361,600,000	11,223,520,200
1976	6,443,938,300	1,979,000,000	556,111,000	3,865,840,000	12,844,889,300
1977	6,741,744,100	2,105,000,000	602,268,300	4,114,413,000	13,563,425,400
1978	7,260,097,300	2,278,000,000	652,968,100	4,439,452,000	14,631,406,200
1979	8,407,894,000	2,435,000,000	707,878,000	4,899,699,000	16,450,471,000
1980	9,075,381,800	2,620,000,000	738,317,000	5,274,226,000	17,707,924,800
1981	10,019,521,200	2,866,000,000	787,800,000	5,801,059,000	19,474,380,200
1982	9,343,619,900	2,952,000,000	739,419,000	4,843,869,000	17,878,890,800
1983	9.845,258,200	2,976,000,000	814,100,000	5,600,891,000	19,342,249,300

Sources: Fibre Boxes, Fibre Box Assn.; Folding Cartons, Paperboard Packaging Council; Set-up Boxes, Natl. Paperbox & Packaging Assn; Other, including cans, tubes, drums, sanitary containers, and die-cut paperboard, from Annual Survey of Mfrs.

B-1 Total U.S. Pulp Production, Net Supply & Comsumption (M short tons)

Period	U.S. Produced	Imported	Exported	Net New Supply	Consumed in Board and Paper	Non-Paper Uses
1953	17,537	2,158	162	19,533	18,684	799
1963	30,121	2,775	1,422	31,475	30,220	1,034
1973	48,355	3,993	2,344	50,004	48,862	1,146
1975	40,583	3,078	2,565	41,096	42,620	783
1977	46,858	3,864	2,640	48,082	46,704	1,097
1979	53,225	4,382	2,791	54,816	53,057	1,222
1980	53,319	4,026	3,806	53,539	52,321	1,166
1981	54,362	3,804	3,677	54,489	53,054	1,137
1982	52,443	4,289	3,547	53,185	51,784	1,110
1983	54,905	5,233	4,328	55,810	54,215	1,134

Source: American Paper Institute.

high for some products that they can be imported from the U.S., including freight, at significantly lower cost than they can be produced at home from native or imported raw materials. However, as seen in Table B-2, the volumes of both exports and imports vary greatly with the grade of pulp concerned.

Table B-2: As usual, the U.S. output of bleached kraft pulp reached a new all-time high last year, and—also as usual—its export volume exceeded that of all other pulp grades combined. This popularity goes on and on, despite a price increase of 143% over 10 years, as seen in Table B-3.

A measure of the bleached-pulp proliferation is this: In 1973, net supply of bleached plus unbleached kraft pulp was recorded by federal agencies as 32.573 million short tons, of which the bleached material represented 44%. By 1983, the combined net supply had gone up 45%, to 45.292 million tons. But of that additional new tonnage in the decade, 65% was in bleached pulp, which thus represented more than half of the 1983 net supply—in competition with the unbleached pulp, basic material for the nation's vast production of kraft linerboards.

A sad development to be seen here is the decline in virgin bleached sulfite tonnage—down 25% in 1983 net supply from a decade ago, and by 40% in 20 years. This is in part because of replacement by sulfates in some applications, and in part through replacement, at relatively low cost, by recycled pulps.

Table B-3: The sudden impact of the early-1970s escalation in world petroleum prices is nowhere better illustrated than in pulp price trends, as the costs of production soar.

For example, between 1953 and '63 the prevailing ton-price for unbleached kraft pulp rose a sedate $21.18 or 22%, and that of bleached kraft actually droped 2%. Between '63 and '73 the price for unbleached went up a modest 52% and for bleached rose 38%. Then came OPEC! In the years between mid-'73 and mid-'84 (these are mid-year prices) the cost of unbleached kraft pulp shot up by 137%, and of bleached by 143%.

From another view: In the 10-

odd years since 1973 (when the Arab oil price erupted), the price of bleached kraft pulp—especially vulnerable to chemical costs—rose by six times more than it had in the 20 years preceding 1973. In another aspect: The price of bleached kraft pulp has increased 275% in the past 30 years, and more than four-fifths

B-2—U.S. Pulp Production, Net, Supply by Principal Paper Grades (M short tons)

	UNBLEACHED KRAFT				BLEACHED KRAFT				SEMIBLEACHED KRAFT			
Year	**Imported**	**Domestic**	**Exported**	**Net Supply**	**Imported**	**Domestic**	**Exported**	**Net Supply**	**Imported**	**Domestic**	**Exported**	**Net Supply**
1953	**293**	**6,753**	**29**	**7,107**	**590**	**2,692**	**134**	**3,269**	242	878	75	1,045
1963	223	10,502	149	10,581	1,282	7,439	501	8,220	525	2,427	304	2,748
1973	**368**	**17,580**	**71**	**17,877**	**2,500**	**13,228**	**1,032**	**14,696**	**189**	**1,826**	**80**	**1,744**
1975	190	15,227	96	15,301	2,132	12,756	1,379	13,509	104	1,375	87	1,384
1977	**245**	**18,399**	**104**	**18,540**	**2,588**	**14,887**	**1,369**	**16,106**	**138**	**1,538**	**89**	**1,587**
1979	258	19,391	199	19,450	2,935	17,987	1,908	19,014	137	1,651	97	1,691
1980	**263**	**19,942**	**202**	**20,002**	**3,355**	**18,990**	**2,014**	**20,331**	**128**	**1,704**	**99**	**1,733**
1981	305	21,133	215	21,223	3,611	20,008	2,048	21,571	119	1,816	96	1,839
1982	**283**	**19,617**	**199**	**19,701**	**3,559**	**19,722**	**2,019**	**21,262**	110	1,686	89	1,707

	UNBLEACHED SULFITE				BLEACHED SULFITE				SEMICHEMICAL		
Year	**Imported**	**Domestic**	**Exported**	**Net Supply**	**Imported**	**Domestic**	**Exported**	**Net Supply**	**Domestic**	**Exported**	**Net Supply**
1953	**380**	**594**	**31**	**944**	**589**	**2,406**	**87**	**2,908**	1,198	n.a.	1,198
1963	128	510	57	581	508	2,180	194	2,494	2,621	n.a.	2,621
1973	**147**	**373**	**5**	**515**	**356**	**1,920**	**293**	**1,983**	4,009	5	4,004
1975	60	366	23	403	299	1,659	246	1,712	3,419	9	3,410
1977	**57**	**413**	**8**	**462**	**454**	**1,656**	**192**	**1,918**	5,327	4	5,323
1979	39	287	7	319	396	1,248	145	1,499	6,812	12	6,800
1980	**32**	**365**	**7**	**390**	**372**	**1,449**	**137**	**1,684**	7,946	14	7,932
1981	29	249	7	371	337	1,389	122	1,604	8,401	15	8,416
1982	**33**	**394**	**8**	**419**	**304**	**1,254**	**110**	**1,448**	7,920	14	7,906
1983	37	410	6	491	441	1,261	97	1,477	6,113	7	6,106

Source: Bureau of Census, U.S. Department of Commerce, American Paper Institute

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B-3—Average Yearly North American Pulp Prices (Per Short Ton)

Year	Unbleached Kraft	Bleached Softwood Kraft	Unbleached Sulphite	Bleached Sulphite	Groundwood
1953	$ 96.77	$142.58	$123.18	$146.10	$ 74.56
1963	117.95	139.10	118.77	133.35	87.50
1973	180.00	192.00	170.00	187.00	102.00
1975	335.00	353.00	335.00	354.00	200.00
1977	335.00	365.00	335.00	354.00	200.00
1979	365.00	400.00	375.00	400.00	240.00
1980	395.00	432.00	380.00	420.00	245.00
1981	425.00	465.00	385.00	440.00	250.00
1982	440.00	470.00	430.00	440.00	250.00
1983	372.00	408.00	354.00	395.00	250.00
1984 1st half	426.00	467.00	400.00	480.00	260.00

Represents announced contract levels—not necissarily the actual selling price.

of that rise has appeared in the latest 10 years.

Paperstock

Table C-1: In 1983, total recovery volume of secondary fibre reached a record tonnage for any year, which sounds uplifting until it is noted that, over the past two decades of our greatest economic expansion, the tonnage of U.S. paper/board consumed went up 75%, but only one-fifth of the added material appeared as a reclaimed-fibre increase.

One strongly encouraging trend, as for many other basic commodities, is that of export demand, which last year produced record-high overseas shipments. Indeed, trends of the past half-dozen years suggest that export, to both industrialized and developing countries, may provide a future outlet for our reclaimed fibres that is beyond any present prediction.

Table C-2: Although the percentage of secondary fibre entering into the 1983 U.S. production of paper and board was at its highest level of this decade, it remains a far cry from that in the early years of this economic expansion, three decades ago. If the paper stock ratio in '83 had merely equalled that of '53, an additional 4 million tons of reclaimed fibre would have been taken.

In short, a highly limited effect has been generated by the widely publicized recent-years' appeal for greater resource recovery, and by the intensive research into utilization of non-wood fibres.

It appears that, as in the case of our gas and petroleum supplies, we will not turn to alternate materials until there is no choice.

Table C-3: These price ranges show the highs and lows, in the 18 months ending mid-1984, for basic paper stock grades in representative areas, as reported to *Official Board Markets* by mills and dealers.

A notable and probably irreversible trend in the secondary fibre field is the slow fading of marked

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demand, and thus of price, for such formerly high-volume grades as Mixed Paper, as compared with the high and rising price of the high-grade pulp substitutes. The reason for both shifts is: processing cost.

The recent years' explosion in cost of energy, labor, credit, and transport has elevated processing cost beyond the end-use value of those low-grade fibres.

On the other hand, prices for the better qualities of generator scrap, such as require little or no processing before pulping, have gone in quantum multiples.

For example, 10 years ago the typical mid-continent price for the Mixed Papers grade was about what it is now—despite all inflation—with an $80 range-average for Hard White Shavings. Today, the Shavings prices has more than tripled, because of their ability to directly replace costly virgin pulps, in some cases.

This disparity can only widen, as processing costs increase over the years, along with an expanding supply of good-quality one-use white papers generated in data-processing usages.

Paperboard Mills

Table D-1: Total U.S. production of packaging paperboards in 1983 was at an all-time high, 10.7% above the tonnage of recessed 1982, 2.4% above the previous record of 1979, and 8.7% ahead of 10 years ago. As to the latter increase—it must be noted that the tonnage

C-1—Paper Stock Recovery vs. board/Paper Consumption (M tons)

Year	Board and Paper Consumption	Mill Paperstock Receipts	Total Recovered	Mill Consumption	Imports	Exports	Paperstock Recovery Ratio
1953	31,434	8,427	8,498	8,366	60	114	26.8
1963	43,406	9,655	9,551	9,585	55	230	22.2
1973	67,337	12,264	12,947	12,374	87	683	19.2
1975	55,907	10,228	10,904	10,345	72	861	19.5
1977	65,226	10,279	10,959	11,071	148	1,544	16.8
1979	69,929	12,985	14,245	12,871	170	2,139	20.4
1980	68,564	12,712	15,429	12,620	164	2,717	22.5
1981	69,867	13,480	15,693	13,382	137	2,213	22.5
1982	65,864	12,670	14,797	12,578	135	2,217	22.5
1983	70,566	15,674	18,623	15,560	143	2,619	23.2

Source: American Paper Institute, National Assn. of Recycling Industries

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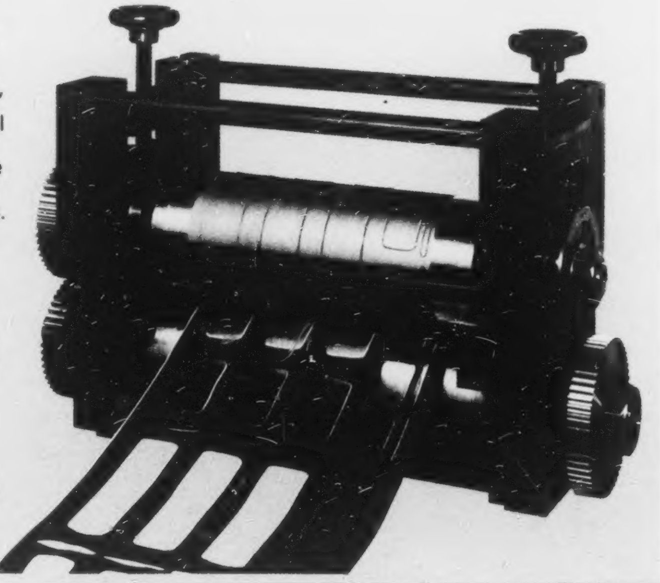

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expansion was 59% between 1963 and '73, and 48% between '53 and '63.

Continuing in 1983 is the growth of recycled corrugating medium which had been eclipsed for many years by virgin furnishes. This is in part because of the need for conserving limited primary-kraft capacity, but also because of the greatly improved technologies for preserving high-quality characteristics during recycling.

Worthy of some note is that the 1983 tonnage of packaging boxboards is actually below that of 10 years ago—with a drop of 1% in folding boxboard, 45% in set-up board, and 15% in milk/food boards. This is a measure of the extent to which alternate materials have taken over applications previously served by paperboard packagings.

On the other hand, this lost tonnage and more reappears in the "other" board category, not identified as box material, but forming components in the shrink- and stretch-packs, the composite cans, and other innovations. Thus, the combined tonnage of these "identified" boxboards plus the "other" boards is up, over the decade.

Table D-2: The 1983 mill activity ratio—simple proportion of actual production of projected capacity—was again at traditional level, following the paralysis of 1982. However, this year finds production hovering around 10% above 1983, with no corresponding increase in scheduled capacity.

A similar encroachment occurred in vigorous 1973, with some unfortunate results in postponed maintenance of major machinery and equipment.

At that time, the nation at least had a fairly substantial influx of new capacity about to go on stream. That is not the case now, and in the absence of an economic downturn, the near future may develop sharp shortages in some paperboard grades.

Table D-3: U.S. capacity for packaging paperboard, on basis of existing construction commitments, will expand by a scant 1% between 1984 and '85, comprising a 1.1% advance in containerboard grades and 0.8% for boxboard types.

That is unrecognizeably below the typical average annual advance of earlier years. It is, in fact, the smallest yearly increase in U.S. paper industry history, and is an indicator of the recent years' forced revisions in spending plans.

Basic costs of mill construction have much more than tripled in this single decade, vastly exceeding the improvements in sale price of mill output, or of the converted packaging products. The only near-parallel is the similar escalation of energy prices in these 10 years.

A similar "quantum" advance in paperboard packaging prices is only inevitable, before it again becomes economic to expand the capacity for producing them. But now, here come the years of "agonized readjustment."

Corrugated & Solid Fibre

Table E-1: U.S. box plant production of corrugated plus solid fibre materials in 1983 (without deduction for converting scrap) was the highest in history, 7.3% above recessed 1982, and 1.2% ahead of the previous high in '79, up 11.5% in

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C-2—Ratio of Paperstock to Total Fibrous Materials Consumed in Board & Paper Production (M short tons)

Year	Woodpulp	Paper Stock	Other Materials*	Total	Paper Stock Percent of Total
1953	19,644	8,294	961	28,899	28.7
1963	31,475	9,551	1,285	41,056	23.2
1973	48,889	12,374	883	62,156	20.0
1975	42,620	10,345	587	53,552	19.3
1977	46,704	11,071	627	58,402	19.0
1979	53,057	12,871	723	66,651	19.3
1980	53,321	12,620	588	66,529	19.0
1981	53,054	13,382	1,056	67,492	19.8
1982	51,784	12,578	622	64,984	19.4
1983	54,215	15,560	719	70,494	22.1

Source: API, NARI

*Linter pulp, straw bagasse, etc.

the decade, 99.4% in 20 years, and 216% in 30 years.

It appears that fibre boxes are reaching some saturation point in the shipping container market, as alternate packaging forms remain unable to compete in most uses.

Thus, in the postwar decade of 1953-63, average annual increase was 5.8%; between 1963 and '73 it rose to a 7.9% annual average, as the takeover advanced. But in the latest decade, annual expansion has settled to a 1.6%, more in keeping with national growth rate.

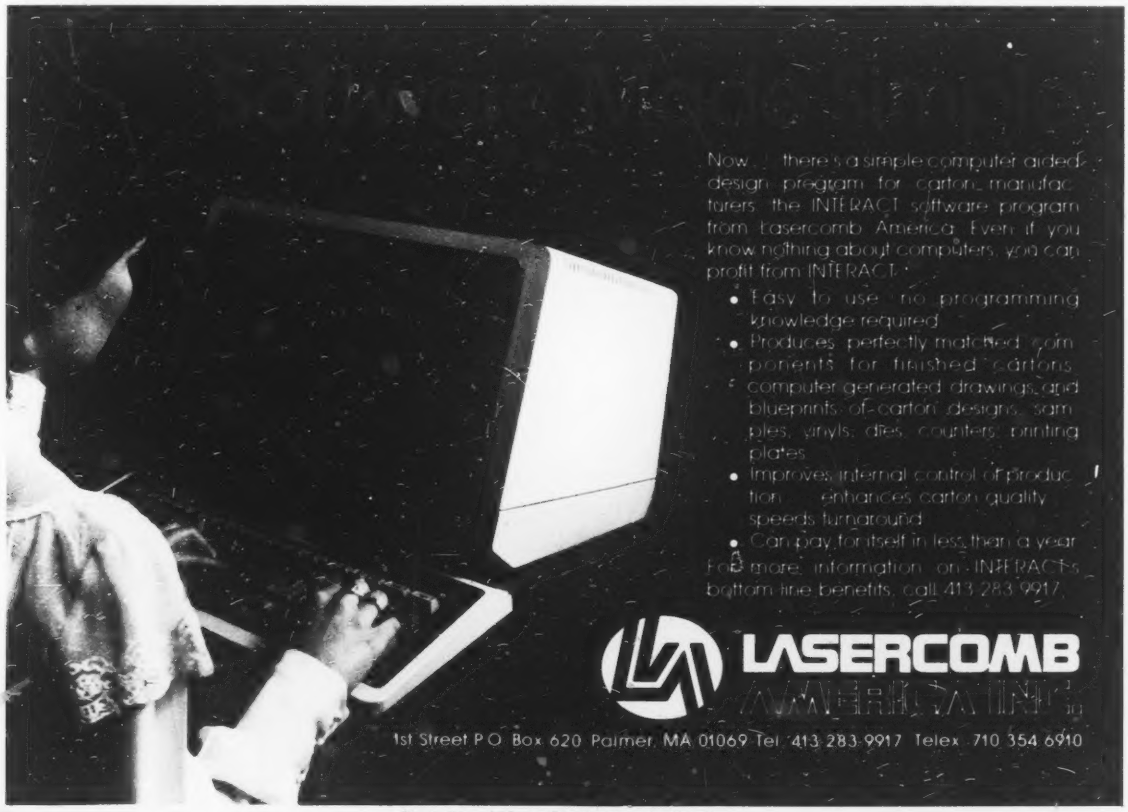
Another indicator of this is the pattern in recent years of annual advance and retreat, sensitive to the economic cycles. This depicts a basically mature industry, unlikely to develop any further major expansions or contractions, but responsive to the regular temporary valleys and peaks of the overall economy.

One more evidence of a present maturity, and also of container diversification, appears in the average weight of corrugated board per unit area. Thus, in 1953, 1 ton of containerboard produced 14,044 sq ft of converted board. In 1963, and again in '73, the footage had gone up to 14,600 sq ft per ton, as kraft and semichemical replaced the dwindling use of older, heavier board types. But in 1983, footage had dropped to 14,360 sq ft per ton—reflecting the rapid increase in production of double- and triple-wall corrugated.

Table E-2: U.S. shipped footage of corrugated plus solid fibre products in 1983 was the highest of all time, up 7.4% from '82 and 10.7% from '73—the latter year was a then-record. Total value of shipments reached only a second-best, however, down 1.7% from the 1981 record, though 5.4% up from recessive 1982.

The 11% increase in shipped corrugated footage over the 1973-83 decade is only one-ninth of the increase in average-foot value. This value advance is largely in response to the escalation of energy cost that began 10 years ago, and has provided the industry with a cushion against the inflation rate.

Footage of solid-fibre products is



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now only 0.4% of all shipments, roughly one-third of the proportion in 1963 and one-tenth of that in '53. However, while the footage of solid fibre has dropped some 60% over 30 years, the decline in value has been nil! It's clear that the solid fibre materials have some applications in which they are not readily replaced. An example is the popular reusable slip-sheet for separating stacks of blanks and converted products on skids.

The expansion of U.S. per-capita box consumption, compared with the rise in population, illustrates the importance and acceptance of these protective containers in our national economy and lifestyle.

In the 1973-83 decade, individual box demand went up 18%, while the population rose 11%. Since 1963, we have 24% more people, and 77% more boxes for each. And, over the 30 years since 1953, per-capita share of shipping containers has increased three times as fast as the number of persons—47% more people, and 149% more boxes per person.

That, in turn, reflects the vastly improved standards and style of life made possible by the dependable protection and preservation of consumer products over long-distance shipment. In cheery acceptance of this, the average U.S. citizen spent $42.13 for his 1983 share of fibre containers. The individual expenditure had been $23.11 in 1973—$10.95 in '63, and $8.24 in '53.

This four-fold expansion of personal expenditure, over 20 years, counteracts the decline in birth rate of new customers—a trend that has been of considerable concern to market planners.

Thus, between 1953 and '63 the average annual U.S. population increase was 1.8%—half-again the reduced rate of 1.2% between '63 and '73, and not far from double the 1% annual rise in this latest decade. However, as noted, the average citizen's spending for his fibre box share went up five-fold in those 30 years. This compensates not only for the decrease in population rate but for the drop in dollar value.

Table E-3: Developments in super-high-strength corrugated packagings are reflected in the expansion of double- and triple-wall board, compared with standard double-face. These heavy-duty materials comprised 8.6% of the 1983 production (before box conversion) compared with 5.5% in 1953, but their proportion of the footage added over those three decades has been 10% of the total.

Thus, while the double-face share in 1983 remained at 91% of total production, and was up 11% since '73 and 96% since '63 and 211% since '53—output of the heavy-duty boards rose 12% from '73 and 174% from '63, and 393% from 1953.

Production of flexible single-face corrugated continues to remain remarkably stable, over the years, in view of its chief application as a protective wrapper, and that in competition with novel new cushionings such as foamed plastic nodules. It appears that single-face, like the solid-fibre boards, fills some functions in which it is not readily replaced, while at the same time it has little latitude for new uses.

Table E-4: The extent to which non-kraft containerboards have been supplanted by the primary materials is readily seen in this

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summary. In 1953, about 20% of all boards entering into U.S. corrugated/solid fibre production comprised the chestnut, jute, straw, and other venerable grades of yesteryear. By 1963 the proportion had dropped to 2%, and in 1983 was a mere 0.2% of total.

With this fade-out of the bulkier boards, total footage produced in 1983 was up 98% from '63 and 209% from '53, while board tonnage consumed went up only 91% and 194%, respectively—a measure of the adoption of lighter kraft.

However, a distinct reversal may be nearing in that abandonment of non-kraft board production. Once again, that point is appearing in the historic cycle at which the existing kraft mill capacity is hard-put to meet demand. But little construction is currently under way, because of exorbitant building costs of terms of present product prices. Until these factors make their cyclic readjustment, it is almost inevitable that the available non-kraft capacity, now idle or under-scheduled, will become due for another reactivation.

C-3 — Domestic Paperstock Price Ranges Per Ton — 1983-1984

Based on transactions during 1983 and Jan.-June 1984
For current prices see Official Board Markets
Mill prices F.O.B. cars or trucks. All prices in bales — bales 500 lb. min.

	New York	Chicago	Southeast
No. 1 Mixed Paper	$5-15	$7.50-25	$5-20
No. 1 Baled News	35-40	35-55	30-40
Old Corrugated Boxes	45-55	25-60	25-70
Boxboard Clippings	20-25	20-50	20-30
White Ledger	60-65	60-80	55-65
	East	**Midwest**	**Southeast**
Dbl. Lnd. Kraft Corr. Clips	$47.50-82.50	$47.50-82.50	$50-85
Hard White Shavings	180-270	180-270	180-270
Man. Tab. Cards	220-260	220-260	220-260
White News Blanks	65-140	65-140	65-140

D-1 — Paperboard Mill Production by Grades (tons)

Grades	1953	1963	1973	1979	1982	1983
Other (Jute) Liner	827,200	707,400	289,100	402,300	279,000	289,100
Kraft Liner	3,382,000	5,701,000	11,066,800	12,417,300	11,656,500	12,835,600
.009 Semichemical	1,255,700	2,287,100	4,126,500	4,573,600	4,202,500	4,532,700
Recycled Medium	640,800	674,700	1,128,500	1,202,300	1,139,500	1,305,400
Chip & Filler	334,700	262,500	317,100	229,300	230,200	210,200
Total Containerb'd	**6,440,400**	**9,633,200**	**16,928,000**	**18,824,800**	**17,507,500**	**19,173,000**
Folding Boxboard	2,382,500	3,217,200	4,704,500	4,724,700	4,333,700	4,646,000
Set-up Boxboard	680,300	523,200	465,300	306,000	223,600	256,300
Milk/Food Board	963,800	1,680,300	1,594,500	1,443,900	1,283,700	1,358,800
Total Boxboard	**4,026,600**	**5,420,700**	**6,764,300**	**6,474,600**	**5,841,000**	**6,621,100**
Other	2,077,200	3,541,600	5,911,000	6,129,600	5,716,800	6,742,600
Grand Total	**12,544,200**	**18,595,500**	**29,603,300**	**31,428,900**	**29,065,300**	**32,176,700**

D-2 — Board Mill Capacity & Utilization (tons)

Year	Capacity—American Paper Inst.	Utilized (Production)	Activity Rate	Unused—Excess Capacity
1953	13,488,400	12,544,200	93	944,200
1963	19,785,800	18,598,700	94	1,187,100
1973	30,543,000	29,603,300	97	939,700
1975	32,951,000	24,717,300	75	8,237,700
1976	32,338,000	28,439,100	88	3,899,000
1977	32,568,000	28,953,100	89	3,974,900
1978	33,332,000	30,274,900	91	3,024,200
1979	33,559,000	31,428,900	93	2,130,100
1980	33,788,000	30,952,300	92	2,835,700
1981	34,245,000	31,232,200	91	3,012,800
1982	35,501,000	29,065,300	82	6,435,700
1983	35,131,000	32,176,700	92	2,954,300

Source: American Paper Institute. Capacity is obtained by dividing production by activity rate (X100).

Table E-5: Between mid-1983 and mid-'84, for the fifth consecutive year, a drop appeared in the number of operating U.S. corrugated combiner plants, sheet plants, and total companies, according to listings in our *Official Container Directory*.

Since the heyday years of 1978-79, the industry's staff of converting facilities has been reduced by 140 units, including 42 combiner and 98 sheet plants, with 88 operating companies gone from the scene.

However, the remarkable advance in productivity per-plant continues, through development and installation of markedly more effective equipment. In 1954, the average U.S. corrugated combiner plant produced 244 million sq ft of board (before conversion). That average reached 286 million in 1964, and 363 million in '74, and a dependably estimated 468 million

continued on page 36

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in 1984. Thus, average combiner plant output has gone up 29% in this decade, and 64% over 20 years, and 92% in 30 years.

Folding Cartons

Table F-1: Folding carton production tonnage in 1983 was up 1.4% from recessive '82, though 3.8% down from the record high of 1979, and only 1.1% above the level of 10 years ago. In fact, the '83 shipments tonnage was only 12.4% higher than that of 20 years ago, and 17.5% up in 30 years.

However, this rough tonnage comparison does not take into account the recent-years replacement of some heavier cartonboards by the newer, stronger, lightweight materials offering greater area per ton. The extent of this replacement may be assessed from the sequences in Table E-2.

In further compensation, the '83 average-ton value, which exceeded the $1000 mark for the first time in 1981, was up 4% from that historic year, and by 101% in 10 years, by 176% from 1963, and by 189% from '53. The total value of expanded folding carton shipments is, therefore, due chiefly to higher

D-3 — Future Board Capacity, Existing Commitments

(313-day basis, at year end, M tons)

	1982	1983	1984	1985
Kraft Linerboard	16,032	16,266	16,390	16,670
Comb. Linerboard (Jute)	379	459	459	459
Semichemical Medium	5,207	5,156	5,218	5,240
Other Medium	1,423	1,469	1,492	1,496
Container Chip	334	315	317	317
Total Containerboards	**23,375**	**23,665**	**23,916**	**24,182**
Bending Board	5,524	5,495	5,550	5,586
Non-Bending Board	331	333	335	336
Bleached Linerboard	104	104	111	109
Other Bleached Packaging	1,812	1,758	1,799	1,827
Other Bleached	219	217	221	222
Total Boxboards	**7,990**	**7,907**	**8,016**	**8,080**
Wallboard Facing	1,255	1,220	1,228	1,228
All Other Board	2,298	2,339	2,353	2,364
	3,553	3,559	3,581	3,592
Total Paperboard	**34,918**	**35,131**	**35,513**	**35,854**

Source: American Paper Institute

E-1 — Annual Fibre Box Plant Production (tons & M sq ft)

	Corrugated		Solid Fibre		Total	
Year	**Tons**	**M Sq Ft**	**Tons**	**M Sq Ft**	**Tons**	**M Sq Ft**
1953	**5,954,200**	**83,618,000**	**353,000**	**2,235,200**	**6,307,200**	**85,853,300**
1963	9,102,200	132,510,100	170,900	1,123,400	9,273,100	133,633,500
1973	**16,284,500**	**236,918,900**	**161,900**	**1,139,300**	**16,446,400**	**238,058,200**
1974	15,284,300	224,534,200	144,500	1,016,700	15,428,800	225,550,900
1975	**13,860,800**	**203,230,200**	**114,600**	**806,600**	**13,975,400**	**204,036,800**
1976	15,667,100	227,817,700	122,200	859,800	15,667,100	228,677,500
1977	**16,337,200**	**238,800,900**	**126,900**	**893,100**	**16,464,100**	**239,694,000**
1978	17,541,250	256,400,900	131,100	922,400	17,708,700	257,323,300
1979	**18,159,700**	**261,072,000**	**137,400**	**966,600**	**18,159,700**	**270,738,000**
1980	17,489,500	251,939,000	129,400	910,200	17,618,900	252,849,200
1981	**17,821,200**	**253,032,000**	**119,800**	**842,500**	**17,941,000**	**253,874,500**
1982	17,717,900	246,298,000	128,300	902,000	17,846,200	247,191,000
1983	**17,717,900**	**246,298,000**	**128,300**	**902,000**	**17,846,200**	**247,191,000**

Source: Fibre Box Assn. Production is at end of combiner, without deduction of box shop waste. Tons represent board consumed

E-2 — Corrugated & Solid Fibre Shipments (M sq ft & value)

	Total M Sq Ft			Total Value			Per Capita Shipments	
Year	**Corrugated**	**Solid Fibre**	**Total**	**Corrugated**	**Solid Fibre**	**Total**	**Mid year U.S. Population**	**Sq Ft Total**
1953	**81,154,500**	**2,151,700**	**83,306,200**	**$1,247,478,400**	**$67,712,000**	**$1,315,190,400**	**159,636,000**	**521.9**
1963	127,471,800	1,116,000	128,587,800	2,025,591,400	40,067,800	2,065,659,200	188,616,000	681.4
1973	**226,984,300**	**1,067,900**	**228,052,200**	**4,815,486,600**	**46,569,700**	**4,862,056,300**	**210,404,000**	**1014.8**
1974	215,119,000	953,000	216,072,000	5,742,301,300	50,683,600	5,792,984,900	211,909,000	1019.6
1975	**193,573,100**	**756,100**	**194,329,200**	**5,578,612,500**	**45,152,700**	**5,623,765,200**	**213,641,000**	**909.6**
1976	215,564,600	806,600	216,371,200	6,395,870,800	48,067,500	6,443,938,300	214,659,000	1008.0
1977	**226,359,700**	**837,800**	**227,975,000**	**6,691,170,000**	**50,574,100**	**6,741,744,100**	**216,383,000**	**1050.0**
1978	242,998,100	898,900	243,898,000	7,204,311,000	55,786,300	7,260,097,300	218,228,000	1115.5
1979	**249,701,000**	**942,000**	**250,643,000**	**8,344,624,600**	**63,269,400**	**8,407,984,000**	**220,099,000**	**1138.8**
1980	240,490,000	888,000	241,277,000	9,010,411,600	64,970,200	0,075,381,800	223,174,000	1081.6
1981	**245,331,000**	**821,000**	**246,152,000**	**9,956,771,000**	**62,750,200**	**10,019,521,200**	**226,292,000**	**1087.7**
1982	234,306,000	879,000	235,185,000	9,278,984,700	64,630,200	9,343,619,900	230,547,000	1072.2
1983	**251,618,000**	**921,000**	**252,539,000**	**9,778,198,700**	**67,059,500**	**9,845,258,200**	**233,662,000**	**1080.8**

unity value, and not to increased tonnages.

Indeed, a fair measure of the insistent inflation of the dollar may be seen in that the average-ton value of folding carton shipments between 1973 and '83 was nearly four times that between '63 and '73. In that earlier decade, the total increase was a moderate $150 per ton. In these latest 10 years, it has been $570.

In any event, this decline in volume for folding cartons, as well as for rigid paper set-up boxes, again illustrates the success of alternate materials and packagings in replacing small paperboard boxes.

For a comparison—the tonnage of board entering into corrugated container production increased 13% in the decade ending 1983, versus the 1.1% for folding cartons. Over the 20 years beginning 1963, corrugated tonnage expanded by 102%, and since '51 by 210%, compared with those respective increases of 12% and 23% for folding cartons.

An even more doleful comparison is per-capita consumption of the cartons and the containers. Twenty years ago, the average U.S. citizen had a 96.5-lb share of the year's corrugated, and 30.8 lb of its cartons. In 1983 his corrugated share was 157.5 lb—up 63% in the double-decade, while his carton share was 27.9 lb—down 9% in a 24% population increase!

Table F-2: The advances of recent years in consumption of highest quality cartonboards reflect the response of box designers to successful challenge by alternate packagings. Solid blached sulfate and clay-coated materials in 1983 held a combined 74% of total production—and the proportion of either was half-again greater than the combined shares of all other board grades together.

On the other hand, some trend is lately appearing toward greater use of the less-costly boxboards. This is in part because of increasing price differential, and in part because the "greater visual appeal" concept has been less than wholly successful in stemming the tide of those alternate packagings.

Hence, during the cheap-material, cheap-energy 1960s decade, the use of clay-coated boards went up 41%, while that of the pedestrian patent-coated dropped 73% and laminated boards went off 42%. In

E-3 — Grades of Corrugated Board Production

Year	Single Face	Double Face	Double and Triple Wall	Total
1953	1,756,000	77,263,100	4,599,000	83,618,100
1963	1,453,600	122,784,800	8,271,700	132,510,100
1973	1,490,000	216,841,400	20,195,800	238,527,200
1974	1,492,200	203,448,600	19,153,800	224,094,600
1975	1,165,500	186,172,400	15,892,300	203,230,200
1976	1,305,200	207,879,800	18,632,700	227,817,700
1977	1,216,500	217,183,800	20,400,600	238,800,900
1978	1,265,000	232,827,000	22,309,000	256,401,000
1979	1,166,000	236,670,000	23,236,000	261,072,000
1980	1,144,000	229,054,000	21,741,000	251,939,000
1981	1,126,000	229,808,000	22,098,000	253,032,000
1982	1,118,000	224,180,000	20,921,000	246,289,000
1983	1,232,000	240,302,000	22,669,000	264,203,000

Source: Fibre Box Assn.

E-4 — Corrugated & Solid Fibreboard Consumption (tons)

Year	Kraft & Jute Liners	.009 Corrugated Materials	Liner & Filler Chip	Total
1953	4,159,100	1,861,100	292,000	6,307,200
1963	6,217,900	2,873,100	182,100	9,273,100
1974	10,621,200	4,746,200	61,400	15,428,800
1975	9,609,100	4,320,200	46,100	13,975,400
1976	10,782,000	4,844,400	50,700	15,677,100
1977	11,318,300	5,102,500	43,300	16,464,100
1978	12,168,400	5,949,700	45,600	17,708,700
1979	12,456,000	5,654,500	9,200	18,159,700
1980	12,018,500	5,427,400	43,600	17,489,500
1981	12,262,400	5,530,400	28,400	17,821,200
1982	11,751,300	5,337,400	29,200	17,117,900
1983	12,594,400	5,767,700	33,600	18,395,700

Source: Fibre Box Assn.

E-5 — Fibre Box Plants, Equipment, Investment, Employees

	1954	1964	1974	1977	1978	1979	1980	1981	1982	1983	1984
Converting Plants	342	463	619	654	654	649	633	621	618	615	612
Sheet Plants	299	504	739	796	795	811	789	772	766	727	713
Total Plants	**641**	**967**	**1,358**	**1,450**	**1,449**	**1,460**	**1,422**	**1,393**	**1,384**	**1,342**	**1,325**
Dbl.-Face Corrugators Operated	404	534	704	755	751	733	722	685	674	665	655
Dbl.-Face Corrugators Total Trim (inches)	30,819	41,432	56,381	61,774	62,811	62,424	62,209	62,175	61,020	60,938	60,608
Pasters Operated	50	34	36	36	36	36	34	33	32	30	28
Pasters Total Trim (inches)	4,243	2,866	2,989	3,005	3,005	3,005	2,857	2,737	2,654	2,488	2,322
Total Companies	**459**	**483**	**784**	**875**	**894**	**884**	**879**	**877**	**853**	**819**	**806**
Est. Investment (MM$)	$327.7	$569.7	$1,128.5	$1,272.5	$1,334.9	$1,426.1	$1,568.7	$1,646.5	$1,615.9	$1,603.6	$1,605.2
No. Employees	48,300	62,400	71,900	65,100	67,300	67,500	63,600	63,100	54,800	59,600	62,300

Source: Plant and machine data from **Official Container Directory:** investment estimated; employment from Fibre Box Assn. A converter must operate complete corrugators or paster to be so classed; one operating only single facers is classed as a sheet plant (one who buys combined board from converters). Companies represent entities ignoring influence of subsidiaries, affilitates or parent relationships, non-operating parent companies not counted.

F-2 — Grades' Share of Folding Boxboard Production (M Tons and % of Total)

Grades	1960		1970		1978		1980		1981		1982		1983	
Solid Bleached Sulfate	728	25.5%	1,144	37.2%	1,236	37.4%	1,236	37.4%	1,180	36.1%	1,128	35.0%	1,146	35.1%
Clay-Coated	734	25.7	1,033	33.6	1,181	35.0	1,179	35.6	1,271	38.8	1,288	40.0	1,276	39.1
Kraft	226	7.9	295	9.6	406	12.0	432	13.0	390	11.9	380	11.8	431	13.2
Bending Chip	326	11.4	231	7.5	198	5.9	156	4.7	164	5.0	149	4.6	160	4.9
Laminated	206	7.2	120	3.9	110	3.3	115	3.5	103	3.2	115	3.6	121	3.7
Bleached Manila	208	7.3	114	3.7	90	2.7	71	2.1	60	1.8	66	2.1	65	2.0
Patent Coated	391	13.7	105	3.4	85	2.5	67	2.0	53	1.6	43	1.3	32	1.0
All Other	28	1.3	33	1.1	42	1.2	55	1.7	56	1.7	50	1.6	33	1.0
Total	**2,856**	**100.0**	**3,075**	**100.0**	**3,375**	**100.0**	**3,311**	**100.0**	**3,274**	**100.0**	**3,219**	**100.0**	**3,264**	**100.0**

Source: Paperboard Packaging Council.

F-3 — Folding Carton Plants, Machines & Capacity

	1953	1963	1973	1978	1980	1981	1982	1983	1984
Plants	567	610	706	743	723	711	691	679	673
Companies	434	478	505	527	508	501	485	476	471
No. Platen Cutters & Creasers	1,604	1,371	1,453	1,514	1,521	1,502	1,488	1,474	1,467
No. Cylinder Cutters and Creasers	1,883	1,974	2,332	2,441	2,439	2,440	2,432	2,424	2,419
No. Blankers — Web fed	190	174	294	339	330	319	313	307	302
No. Blankers — Sheet fed	33	89	435	565	608	602	574	556	548
MM sq in./hr Capacity	8,984.3	12,429.6	20,545.4	29,543.0	31,250.8	31,320.6	30,959.9	30,487.1	30,161.6
MM sq in. Capacity/hr/plant	15.85	20.38	29.10	36.76	43.22	44.05	44.80	44.90	45.10
Estimated Number of Employees	40,900	60,120	75,820	80,900	78,100	75,600	74,300	73,400	72,700
Estimated Capital Investment	$144.2	$387.7	$763.2	$996.3	$1029.5	$1047.0	$1263.5	$1315.3	$1319.1

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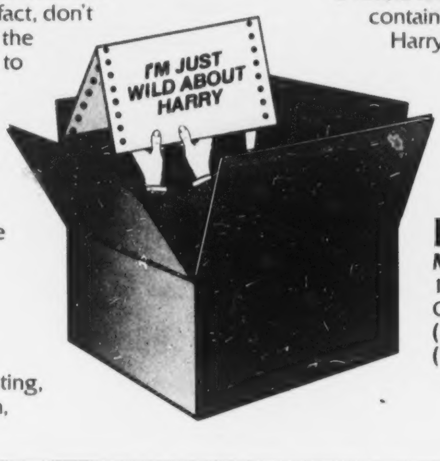

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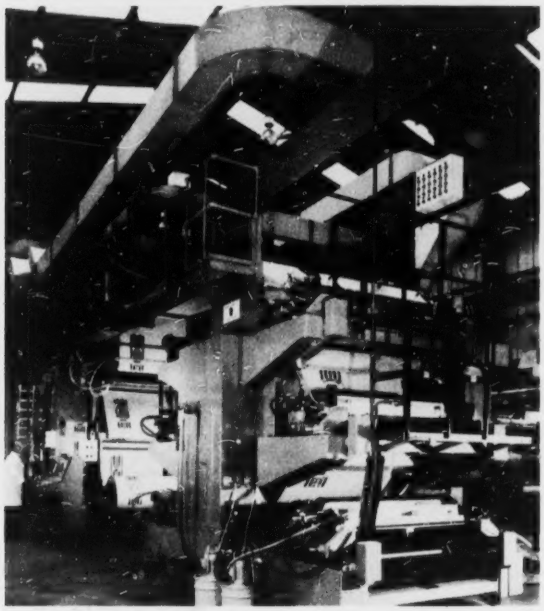

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F-1 — Folding Boxboard Consumed, Shipped, & Shipment Value

Year	Consumed Tons	Index (1967 = 100	Shipped Tons	Dollars (1000)	Average Value/ Ton
1953	2,647,600	85.5	2,250,525	$764,886	$389.87
1963	2,906,000	132.4	2,353,900	959,800	407.75
1973	3,227,000	104.2	2,614,000	1,460,000	558.53
1974	3,160,000	102.0	2,531,721	1,694,960	669.50
1975	2,938,000	94.8	2,380,000	1,755,000	737.29
1976	3,200,000	103.3	2,592,000	1,979,000	763.50
1977	3,258,000	105.2	2,639,000	2,100,000	797.65
1978	3,375,000	108.9	2,734,000	2,278,000	833.21
1979	3,393,000	109.5	2,748,000	2,435,000	886.10
1980	3,311,000	106.9	2,682,000	2,620,000	976.88
1981	3,274,000	105.7	2,652,000	2,866,000	1080.69
1982	3,219,000	103.9	2,607,000	2,952,000	1,132.34
1983	3,264,000	105.4	2,644,000	2,976,000	1,125.57

Source: Paperboard Packaging Council

contrast, consumption of the premium solid bleached sulfate rose 57% in that 10 years. But over the next 10, it was another story.

In 1981, clay-coated board tonnage exceeded that of the solid bleached for the first time in 20 years—and is still doing so. This is scarcely odd. Twenty years ago, the difference in price of solid bleached over clay-coated was $60. By 1973 it was $95. Today it is $175—and the differential with white-patent-coated is $240.

Added board costs of that magnitude must influence box designers strongly, when evaluating the sales advantage of visual appeal in their packages.

Table F-3: The number of producing U.S. folding carton plants decreased in 1983 for the seventh consecutive year, and the number of separate operating companies for the eighth, according to revised listings in our *Official Container Directory*.

U.S. carton plants in 1983 employed some 5400 fewer people than in 1980, and 8200 fewer than in peak '78, because of the continuing shut-down of marginal plants and greater efficiency of automated equipment.

The reduction in number of plants is compensated somewhat by an increase in average converting capacity. At mid-1984 the industry's cutting/creasing capacity—a measure of carton operation size—had reached 45.1 million sq in. per hour per average plant—some 55% higher than a decade ago. During the same 10 years, investment per average plant went up 80%, and the value of its shipments rose 114%.

The average U.S. citizen spent $12.74 for his folding cartons in 1983, up 84% from $6.94 in '73. The average industry employee, including office personnel, represented $40,940 worth of carton shipments, up $110 from $19,520 in 1973.

Composite Cans/ Tubes/Cores

Table G: The progress of these diverse recycled-fibre conversions illustrates that bare-percentage expressions of increase in volume and value may be highly misleading in an assessment or product influence.

In the case of composite cans, for an example, a relatively moderate annual expansion might denote a

G—Composite Can, Tube and Core Commercial Production

Estimates by Composite Can and Tube Institute. Washington, D.C.

year	All Products	Composite Cans	Products other than Cans*
1953	$160.8	$84.6	$76.2
1963	249.0	125.4	123.6
1973	502.2	280.6	221.6
1974	560.4	332.8	227.6
1975	644.3	387.8	256.5
1976	727.5	421.8	305.7
1977	783.3	449.5	334.3
1978	840.4	474.2	366.2
1979	900.0	488.8	411.2
1980	034.1	514.4	419.7
1981	1021.0	555.3	465.7
1982	1017.2	565.0	452.2
1983	1131.2	633.4	497.9

Includes tubes, cores and miscellaneous specialties.

virtual takeover of the market for a fully worthwhile sector of good-volume product end uses.

For that reason, the 11.2% value rise in 1983 from '82 for the cans and related products would appear to be stunningly below the annual average of a 125% total advance in the decade, and of 353% since 1963, and a startling 604% expansion since '53, though in itself that improvement compares more than favorably with the year's expansion in other areas.

One factor in the moderated expansions of recent years is the nearly complete takeover from metals in such high-volume end uses as the one-quart motor-oil cans, and those for citrus-juice concentrates, which are produced in billions per year.

The composite products "other than cans" include some of the most competently devised functional developments in any materials area. These comprise the cores and tubes, which have provided strength and service superior to steel, at lower cost.

Unfortunately, however, we all are both the beneficiaries, and sometimes the victims, of new developments. One one-quart composite motor-oil can, hard won away from steel, and recently providing a full 36% of this industry sector's output, is under a strong and sturdy attack.

The challenger, almost predictably, is the blown-plastic bottle. As of this 1984 summer, major oil companies are publicizing their shift to the plastic containers. Test marketing of public preference has indicated that any producer who does not replace the composite can may be endangering his market share.

Observing this trend, the largest U.S. producer of composite cans is tooling up for manufacture of plastic alternates. And, because of recent industry concentration through acquisition and merger, the two leading producers have withdrawn from reporting of their volume, to avoid revealing market share. As a result, the venerable Composite Can and Tube Institute has ceased publication of industry statistics, and has gone the way of other beset associations in restricting its business reports to its member companies.

Fibre Drums

Table H: Gains over 1982 in both total of units pro-

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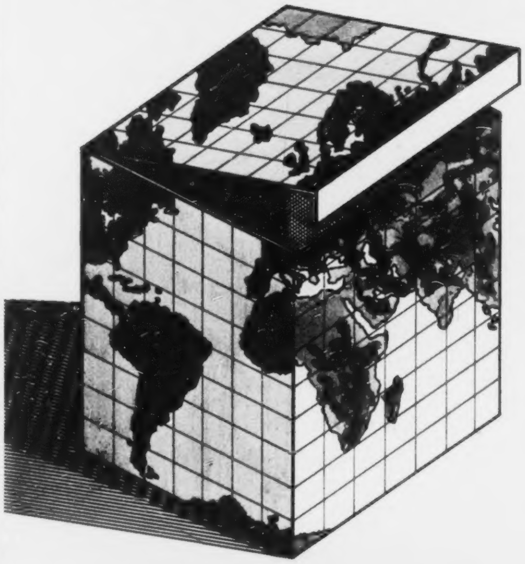

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duced (4%) and value per unit (13.6%) brought the 1983 fibre drum sale value well above $550 million—a gain of 18% over '82 and of 295% in the decade.

Some 70% of this decade's improvement in value has come during its second half—since 1978. Though a good part of this current-dollar rise reflects inflation, the increase in unit production—63% since 1973—indicates that research has been effective in design versatility and new applications. These include a wide acceptance in, for example, the growing field of powdered-metal usages, and in advanced features for the safe transport of inflammables, explosives, toxics, and other hazardous materials.

While precise statistics on fibre drum end uses are not complied by any central industry association, an informed estimate of basic categories is: chemicals 42%; food and related products 17%; plastic resins 16%; pharmaceuticals 7%; detergents and soaps 6%; machine parts, abrasives, metal powders, wire, and stampings 6%; rolled materials such as films 2%; and all other products and materials 4%.

H—Growth of the Drum Industry

Year	Estimated Million Drums	Estimated Average Price Per Drum	Estimated Dollar Equivalent
1953	29.7	$2.04	$60,588,000
1963	32.2	2.30	74,060,000
1973	50.9	2.83	143,915,000
1974	56.8	2.94	167,149,000
1975	46.6	2.96	137,936,000
1976	50.7	3.17	160,719,000
1977	54.6	3.41	186,190,000
1978	59.0	3.83	226,074,000
1979	64.0	4.21	269,440,000
1980	69.4	4.80	333,120,000
1981	72.9	5.33	388,557,000
1982	79.9	6.02	480,998,000
1983	83.1	6.84	568,400,000

I-1—Rigid Box Industry Sales

(Percentage distribution by end use)

	1963	1973	1983
Testiles, Apparel & Hosiery	24.59	9.5	3.2
Department Stores & Specialty Shops	15.78	14.4	5.6
Cosmetics & Soap	6.78	4.3	1.4
Confections	12.41	10.0	16.7
Stationary & Office Supplies	5.49	7.6	17.2
Jewelry & Silverware	4.16	8.7	10.1
Photographic products & Supplies	2.39	2.4	4.5
Shoes & Leather	3.00	6.7	0.5
Drugs, Chemicals & Pharmaceuticals	4.77	7.2	6.6
Toys & Games	2.82	2.5	2.9
Hardware & Hosehold Supplies	3.63	4.6	7.6
Food & Beverages	1.48	1.1	1.5
Sporting goods	1.13	1.6	0.5
others & Misc. Customers	11.57	19.4	21.7

I—Annual Dollar Sales

Dollar Sales Year To Year		
Year	(in millions)	(% Change)
1953	$279.3	—
1963	314.8	+ 12.7
1968	421.8	+ 34.0
1973	485.0	+ 15.0
1974	536.9	+ 10.7
1975	483.2	− 10.0
1976	556.1	+ 15.5
1977	602.3	+ 8.3
1978	653.0	+ 8.4
1979	707.9	+ 8.4
1980	738.3	+ 4.3
1981	787.8	+ 6.7
1982	739.4	− 6.1
1983	814.1	+ 10.1

Rigid Boxes

Tables I-1 & I-2: In 1983, the rigid box (or set-up box)—the oldest of the paper box types—reached its highest dollar sales value in history.

Last year, that industry was reported to be up 10.1% from 1982, up 678% from 1973, and up 159% from 1963.

Thus did the rigid box industry continue to display one of the most resilient marketing performances in packaging history.

Rarely, if ever before, has any packaging form seen 60% of its largest single end use (Textiles, Apparel & Hosiery) lost to competition within a single decade—and 87% within two decades.

Fewer still could not only have survived, but expanded their annual sales value.

The venerable rigid box did precisely that.

That performance is, in fact, one aspect of a massive evolution.

At the "high tide" of around 20 years ago, approximately 800 rigid paper box plants, large and small, were listed in our *Official Container Directory*.

These now have been consolidated into about 360 such facilities, producing boxes of much greater annual value, though consuming much less total paperboard.

The old-time "cottage industry" set-up boxmaker has either closed his operation, or else he has merged it into larger, better-financed units.

At the same time, the great majority of set-up box plants in this country are independently owned and operated. This distinguishes this particular industry from the situation that takes place within the folding carton and corrugated areas. In those latter two, approximately 85% of total conversion is integrated.

The typical rigid box plant can thus offer a degree of "personal service" not to be matched elsewhere in packaging.

The rigid-box producers are armed with a vastly wider arsenal of accessory materials. Among these advantages are the E-flute corrugated, the transparent window inserts, the blown-plastic colored paste-ons, the strong lightweight folding boards—just to name a few.

These innovations have helped greatly in counteracting the rising costs of manufacturing and shipping these low-density box products.

Above all, rigid box producers have been ingenious and aggressive in meeting the demands of new and old markets.

The sequence of end use distribution in Table I-1 was tabulated originally in the order of highest to lowest percentage of industry sales.

It now bears little or no resemblance to that order, as new areas of market opportunity were developed while others declined.

That combination of producer ingenuity and product versatility is reflected in continued success of the set-up box. ☐

paper board packaging

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Computerization in the Box Plant

Folder-Gluer News

How the New Tax Act Affects You

AN HBJ PUBLICATION

paper
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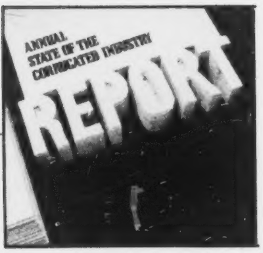
OCTOBER 1984, VOLUME 69, NO. 10

On the Cover:

Paperboard Packaging presents the first of what will be an annual supplement, sponsored by The Harper Companies, on the state of the corrugated container industry.



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Rich Paper Box Has A Wealth of Assets

by Mark Arzoumanian

This family-run rigid box plant values its workers, quality, and the need to modernize its machinery to stay competitive.

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Plant Redesign Through Material-Flow Analysis

by Eric M. Malstrom & Joseph Lane Sr.

A university engineering professor, plant management and a representative of a conveyor manufacturer collaborated on a plant expansion that is already producing dividends.

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COMPUTERS

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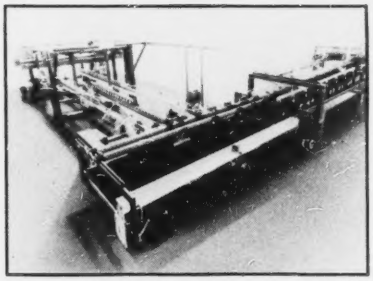
Computerization In the Box Plant

by Robert Gitlin

Whether in the office or down on the production floor, computer systems have made their indelible imprint on the direction the boxmaking field will now be taking.



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STATE OF THE ART

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What's Unfolding In Folder-Gluers?

Whether a plant is converting corrugated containers or folding cartons, management should know about new and ongoing developments in this veteran piece of finishing equipment.

(continued on page 4)

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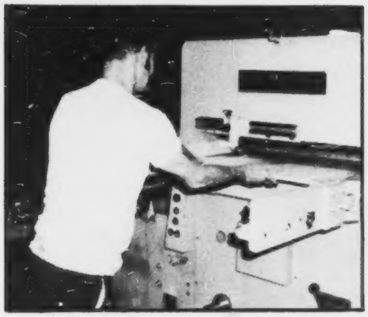

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by Richard Weatherington
Seeing three big tax bills pass Congress in four years, many converters struggle to position themselves securely. Beware: a simple miscalculation could cost you dearly.

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A Minneapolis sheet plant is the first in the U.S. to discover that the Autopress nicely meets its needs in an efficient, compact manner.

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December: Industry Calendar/Package Designing

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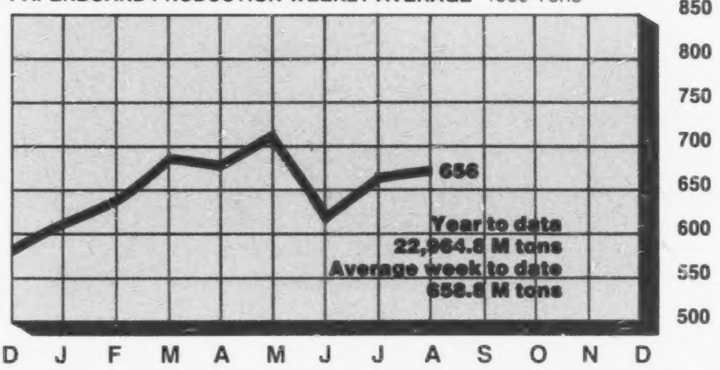
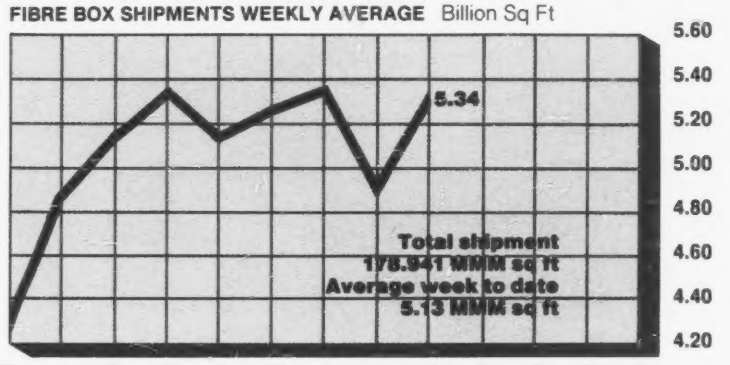
INDUSTRY
STATISTICS FOR 1984

PAPERBOARD PRODUCTION WEEKLY AVERAGE 1000 Tons



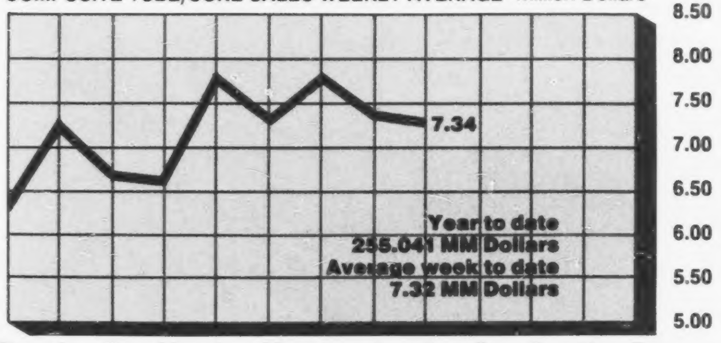
PAPERBOARD MILL OPERATIONS:
The first two-thirds of 1984 ended with an average-week board output that was 9.0% higher than the previous year's level, compared with a rise of 7.4% in 1983 from 1982, and a drop of 9.8% in 1982 from 1981, and a rise of 3.8% in 1981 from 1980, and a drop of 0.7% in 1980 from 1979. In short, this trend illustrates the "averaging out" of industry expansion; a year or two of production growth followed by one or two of decrease, and now and then an "average" compensating year. However, an expanding margin of output suggests that present strength will continue in 1985.

FIBRE BOX SHIPMENTS WEEKLY AVERAGE Billion Sq Ft



PAPERBOARD-TYPE PRODUCTION:
In August, the total board volume figure of 2906.6 M. tons—6% higher than the figure from last year—comprised 2166.2 M of containerboards—up 6.2%—and 740.4 M of boxboards—5.4% up—as projected on historical basis from the American Paper Institute's "production by furnish" reports. This depicts the relatively high vigor of containerboard grades in a resurging market, though the boxboards also are well above an average annual advance. A more realistic comparison is with the "normal" year of 1981—August-end volume is up 4.7% from '81.

COMPOSITE TUBE/CORE SALES WEEKLY AVERAGE Million Dollars



RIGID PAPER BOXES:
A satisfactory performance up to what normally is the summer doldrums has been followed by a strange failure of setup box activity to recover fully from the latter slowdown period. Rigid box billings entered the final third of 1984 with half of the NP&PA regions reporting a decline from last year, and an overall total only minutely up. Geography again continues to produce variations ranging from improvements above 100% in some local sectors to deep double-digit drops in others—though this veteran box form shows an averaging out, over the years, in its regional fortunes.

Management figures at corrugated container plants throughout the United States respond to a survey's questions regarding overall operating considerations.

Statistics Tell Management Story

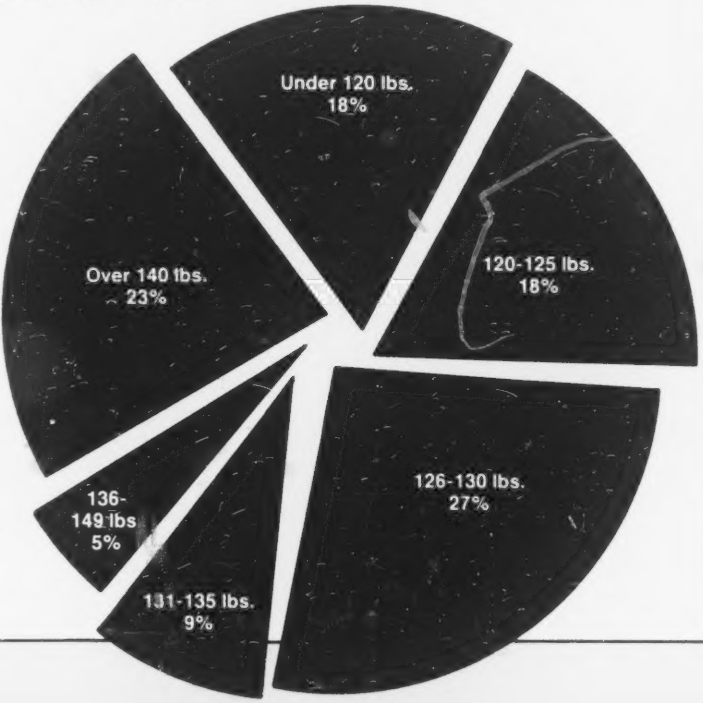
The Corrugated Containers State of the Industry Report would not be complete without good old numbers to back it up and to reflect some of the attitudes key management figures have these days. The following is a graphic presentation of most of the findings we came up with, using Infometrics, the research arm of HBJ Publications Inc., Duluth, Minn.; followed by a written wrap-up of what some of the open-ended questions appear to mean.

We surveyed combiner and sheet plants all through the United States to produce these data. All figures represent combinations of the data for combiner and sheet facilities. Most of what we are reporting here, we are doing so with mean (average) figures and percents of totals.

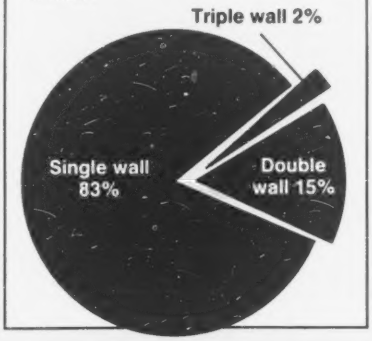
Suffice it to say that our coverage was exhaustive and our results, we feel, stimulating. The bar graphs, pie charts and tables speak for themselves. The rest requires some discussion, which you'll find afterwards.

Paperboard packaging equipment and materials census

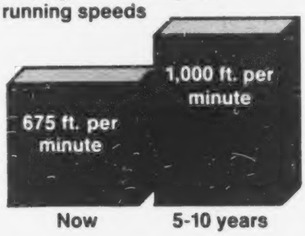
In terms of basis weight scale, what percentage of your total containerboard consumption is in each of the following weight ranges (pounds/sq. ft. of paper)?



What percentages of single, double, and triple wall do you utilize?



Average #1 corrugator running speeds



Please think about price, quality and service as being the most important considerations when either maintaining present machinery or purchasing new equipment.

PERCENTS OF TOTAL

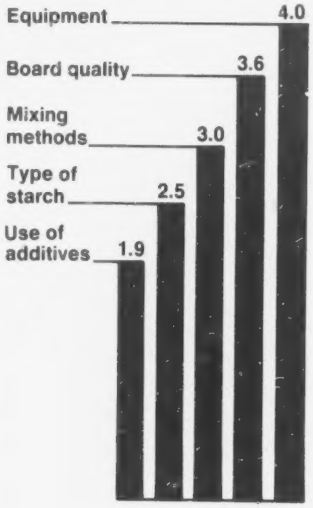
	Extremely important	Very important	Fairly important	Not Very important	Not at all important
Price	21.6	43.2	35.2	—	—
Quality	76.6	22.5	.9	—	—
Service	62.2	33.3	4.5	—	—

Now think about the elements of paper, adhesives, and people as they play roles in cost considerations in your operation.

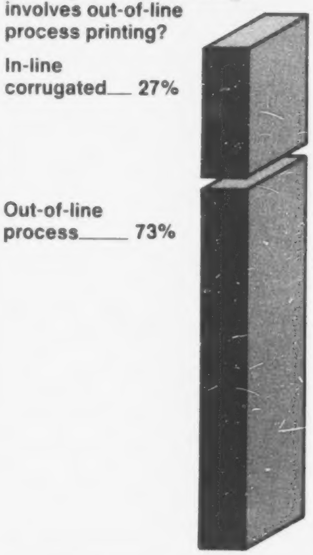
PERCENTS OF TOTALS

	Extremely important	Very important	Fairly important	Not very important	Not at all important
Paper	51.0	40.4	6.7	1.9	—
People	79.6	16.5	2.9	1.0	—
Adhesives	16.3	40.8	31.6	8.2	3.1

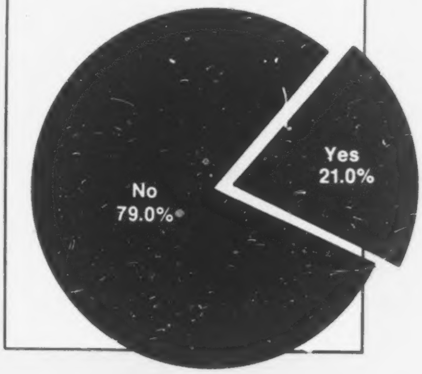
What factors, in order of importance, affect starch consumption. (Most important = 5; least important = 1.)



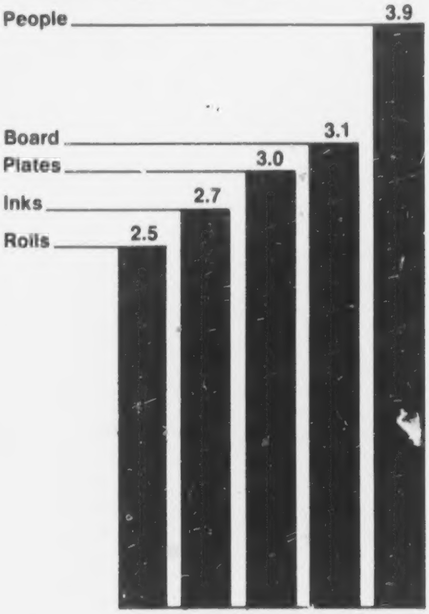
What percentage of your work involves in-line corrugated printing? What percentage involves out-of-line process printing?



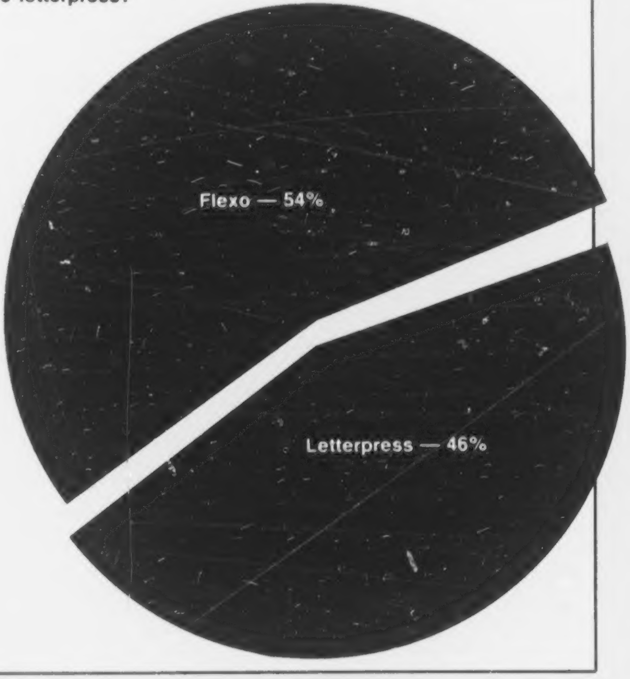
Are you currently using color coatings?



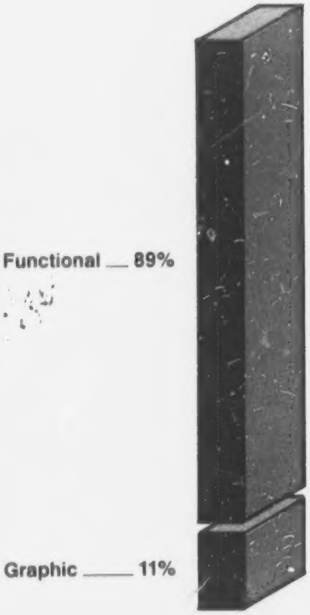
On a scale of 1 to 5, 5 being most important, rank the following troubleshooting considerations.



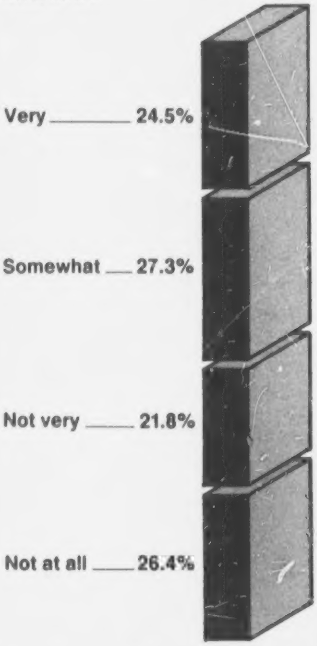
What percentage of your ink rolls is flexo and what percentage is letterpress?



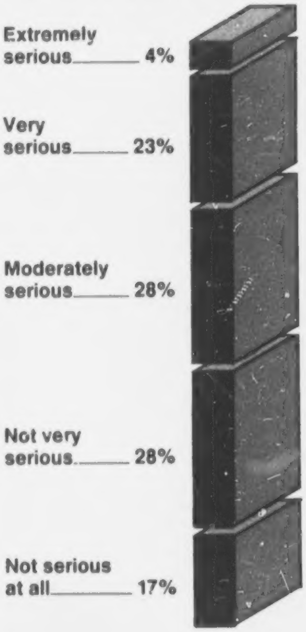
What percentage of your coatings are functional? Graphic?



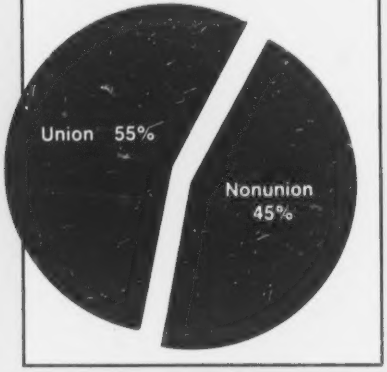
How likely will you be to purchase preprinted linerboard 3 years from now?



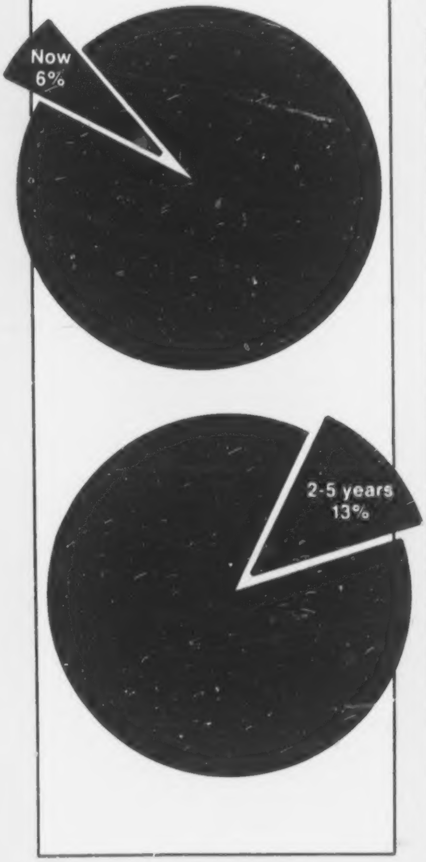
How serious a problem are speed limitations due to linerboard and medium?



What percentage of your labor force is union? nonunion?



What percentage of your production is in display work? In 2-5 years?



For each of the following types of personnel, please indicate the number of persons holding this title at your plant, and the most representative hourly rate of pay associated with a particular title.

TITLE	= OF EMPLOYEES	HOURLY RATE
Corrugator Crew	16.73	$9.00
Corrugator Supervisor	2.91	$12.00
Die cutter Operator	3.03	$7.87
Maintenance Supervisor	1.38	$12.00
Off-bearing personnel	6.91	$7.67
Starch Person	2.21	$8.69
Folder-Gluer Operator	2.97	$8.18
Press Operator	3.39	$7.92
Printer-Slotter Operator	2.66	$8.06
Diemaker	1.83	$9.05
Platemakers	1.40	$8.78
Production Supervisor	4.02	$11.00

How likely are you to be producing preprint linerboard during the next 3 years?